Nema Group Exports 3,609 Commercial Units in 2 Months

(Concluded from Page 1, Column 5)

the same time last year; sales of ⅓-hp. units were 5,530, against 2,995 last year; sales of ½-hp. units 3,318, against 2,850 last year; and of ¾-hp. units 1,965, against a 1936 total for the period of 1,416 units.

Exports to countries other than Canada rose high enough in three classifications to merit mention. Foreign sales of self-contained air conditioners totaled 215 out of world sales of 675; 1,213 condensing units of ⅓-hp. capacity went outside the United States, as did 318 ice cream cabinets. Total exports by Nema companies during the period were 3,609 units.

The Nema report covers sales of the following 15 companies:

Brunner Mfg. Co., Carrier Engineering Corp., Crosley Radio Corp., Frigidaire Corp., General Electric Co., Gibson Electric Refrigeration Corp., Kelvinator Corp., Leonard Refrigerator Co., Merchant & Evans Co., Norge Corp., Servel, Inc., Uniflow Mfg. Co., Universal Cooler Corp., Westinghouse Electric & Mfg. Co., and York Ice Machinery Corp.

Systematic Organization Helped Universal Cooler Win Plant Safety Award

DETROIT — Prompt reports and proper treatment of minor injuries, and systematic organization of plant safety committees were the major factors which enabled Universal Cooler Corp. to better its 1936 severity record (days lost per thousand man-hours worked) 96.8% over that of 1935 to win the Detroit Industrial Safety Council's A. C. Marshall trophy, according to F. G. Ferdon, personnel manager and director of the company's safety campaign.

The Marshall plaque, for which 72 local firms compete annually, is awarded to the company which shows the greatest improvement in plant safety over the previous year.

"We emphasized the competitive angle of the trophy race," explained Mr. Ferdon, "and tried to keep the men's interest aroused by posting the monthly results of the contest on the bulletin board.

"To enccurage the men in reporting immediately even the slightest injury, we penalized all those whom we discovered to be lax in this respect.

"Three plant safety committees, consisting of four members each, were organized to cover the various sections of the plant. These committees throughly inspected the plant each month, and made any recommendations which they thought might improve safety conditions. Their recommendations were submitted to a management safety committee composed of several of the company's executive officers, who authorized such changes as were neemed necessary."

In addition to winning the Marshall trophy, Universal Cooler Corp. placed seventeenth in the list of contestants for the F. A. Morrison award. The Industrial Safety Coucil annually awards the Morrison plaque to the firm which compiles the best safety record for the year, based on the number of lost-time accidents per million man-hours worked.

Stewart-Warner Earnings Show Big Gain

(Concluded from Page 1, Column 5)

counted for 61.60% of the total against 49.12% in 1935; sales to car factories represented 22.63%, against 35.75%, and sales to other industrial concerns 15.77% against 15.13%.

The consolidated balance sheet as of Dec. 31, 1936, shows current assets of $10,052,676, including cash of $1,334,293. Current liabilities were $2,947,722. At the close of 1935, current assets amounted to $8,056,535, including cash and marketable securities of $2,426,664. Current liabilities were $1,740,698.

BRUNNER

Send for the New

REFRIGERATION CATALOG

Five Models of Compressors

Forty-seven Models of Condensing Units from ¼ H. P. to 15 H. P.

BRUNNER MANUFACTURING CO.

UTICA, N. Y., U. S. A.

NEW HENRY Dryers, Strainers and Valves

The Advanced Design and Large Capacity Range of Henry Products are in step with the rapid Progress of Refrigeration and Air Conditioning

THE MOST COMPLETE LINE IN THE INDUSTRY

Patents Pending On All Products

DRYERS

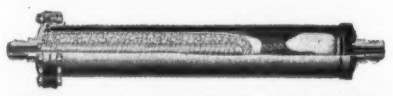
There is a type of Henry Dryer for every installation requirement. An exclusive feature of design is the integral liquid sight port, supplied with certain types.

The dispersion tube, which increases efficiency of dehydration and minimizes pressure drop, is another major feature. Some dryers have end caps; others are flanged for convenience in refilling.

Henry Dryers may be obtained AT THE SAME PRICE filled with any one of the five following dehydrants: Activated Alumina, Anhydrous Calcium Chloride, Calcium Oxide, Drierite or Soda Lime.

TYPE 709 DEHYDRATOR

Designed for small refrigeration units.

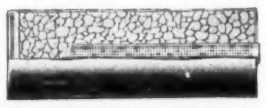


TYPE 733 DEHYDRA-STRAINER

A combination dehydrator and strainer. Asbestos sack is filled with dehydrant and supported inside fine mesh screen. Flanged construction at inlet end permits easy cleaning and refilling.

TYPE 744 CARTRIDGE DEHYDRATOR

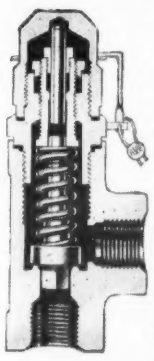
Very easy to refill as dehydrant cartridge can be readily removed and a new one substituted. Our standard dispersion tube, for minimizing pressure drop and increasing drying efficiency, is incorporated as an integral part of the refill cartridge. A strong spring provides POSITIVE TIGHT SEALING ACTION of dispersion tube on inlet fitting, preventing bypassing of refrigerant between outside of cartridge and inner surface of dehydrator shell. Furnished either filled with dehydrant or unfilled.



TYPE 74 REFILL CARTRIDGE FOR TYPE 744 DEHYDRATOR

Available in different lengths for dehydrators of various shell lengths. Packed in moisture-proof container. Choice of these four dehydrants AT SAME PRICE: Drierite, Activated Alumina, Calcium Chloride or Calcium Oxide. With dispersion tube.

VALVES

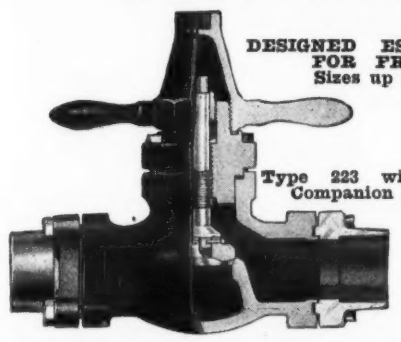


TYPE 615 RELIEF VALVE FORGED STEEL BODY

Range of Relief Point 30 to 300 lbs.

A spring-loaded, soft-seat valve releasing accurately at predetermined relief point. Positive reseating action. Emergency reseating accomplished by tapping push rod. Cap sealed to prevent tampering with pressure setting.

WING CAP VALVES



DESIGNED ESPECIALLY FOR FREON Sizes up to 6"

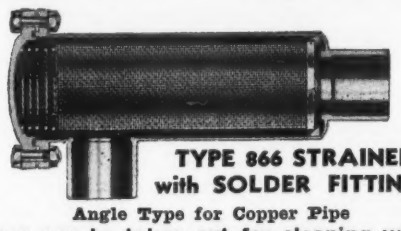
Type 223 with Forged Companion Flanges

Equipped with our patented, rotating, self-aligning, tapered, brass stem disc. Resilient packing developed especially for Freon. Backseating construction permits repacking under pressure. Wing cap can be inverted and its socket used to operate valve. No special wrench is necessary.

Added protection against leaks is provided by cap, forming tongue-and-groove, recessed gasket joint. Long stem travel between closed and wide open positions and full capacity passages insure unrestricted flow through valve. These valves may be obtained with screw ends, or with solder fittings, or with various types of companion flanges.

STRAINERS

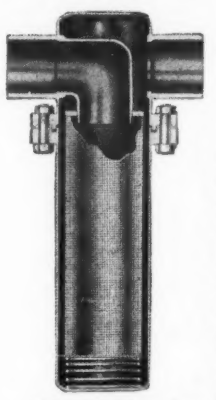
There are 18 types in the Henry line—a size and type for every requirement. Most Henry Strainers have single-joint brass shell, drawn in die with either forged steel distortion-proof flange or soldered brass cap at inlet end. Some strainers have accessible cleanout flange; others removable from line for cleaning. Exceptionally large screen area insures maximum capacity and long service before cleaning. Negligible pressure drop. Compact design. Securely anchored screens—no by-passing of liquid. Silver-soldered fittings.



TYPE 866 STRAINER with SOLDER FITTINGS

Angle Type for Copper Pipe

Screen can be taken out for cleaning without removing strainer from line. Negligible pressure drop. Very large screen area. Will not trap oil. Light in weight. Spring tension provides seal of screen against tapered ring at inlet end. Flanged brass shell. Fitting sizes ⅝" to 2⅝" O.D.



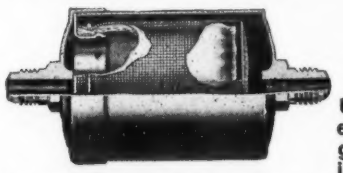
TYPE 877 STRAINER with SOLDER FITTINGS

Horizontal Type for Copper Pipe

Screen can be taken out for cleaning without removing strainer from line. Minimum pressure drop. Very large screen area. Trapping of oil can be entirely prevented by installing strainer so that outlet is pointing upward or downward, or minimized by installing strainer on its side and keeping inlet and outlet in a horizontal plane. Light in weight. Spring tension provides seal of screen against inlet fittings. Flanged Brass Shell. Fitting sizes ⅝" to 1⅜" O.D.

TYPE 885 SMALL STRAINER

Soldered brass shell, ¾" O.D. by 4¾" long. 120 mesh brass screen. Screen area 6¾ sq. in.



TYPE 896 STRAINER

Soldered Shell, Asbestos Sack

Used where exceptional degree of filtering is required. Drawn brass shell with soldered inlet cap. Due to relatively large area of sack, a large amount of foreign matter can be collected before cleaning is necessary. Asbestos sack supported inside fine mesh screen cylinder. Shell 2½" x 2" O. D. Screen area 11 sq. in.

FACTORY REPRESENTATIVES

Atlanta, Ga., Barton D. Wood, Inc.
Cincinnati, Ohio, Barton D. Wood, Inc.
Cleveland, Ohio, Barton D. Wood, Inc.
*__Detroit, Mich.__, J. M. Oberc.
Detroit, Mich., Barton D. Wood, Inc.
Ft. Wayne, Ind., Barton D. Wood, Inc.
*Carry Complete Stock.

Grand Rapids, Mich., Barton D. Wood, Inc.
Jacksonville, Fla., Barton D. Wood, Inc.
*__Kansas City, Mo.__, O. A. Forslund
*__Los Angeles, Cal.__, Pacific Scientific Co.

Miami, Fla., Barton D. Wood, Inc.
*__New Orleans, La.__, C. H. Boyd.
New York, N. Y., C. W. Hudzietz.
*__Philadelphia, Pa.__, A. H. Holcombe, Jr.
Pittsburgh, Pa., Barton D. Wood, Inc.
*__St. Louis, Mo.__, R. H. Spangler.

*__San Francisco, Cal.__, Pacific Scientific Co.
*__Seattle, Wash.__, Pacific Scientific Co.
Shreveport, La., Barton D. Wood, Inc.
Toledo, Ohio, Barton D. Wood, Inc.

STOCKED AND RECOMMENDED BY THESE LEADING JOBBERS

Albany, N. Y., Hoy & Co., Inc.
Atlanta, Ga., Leo S. Bosarge.
Binghamton, N. Y., Service Supply Co.
Boston, Mass., A. E. Borden Co.
Brookline, Mass., Refrigeration Sup. Co.
Charlotte, N. C., Henry V. Dick & Co.
Chicago, Ill., Airo Supply Co.
Chicago, Ill., Harry Alter Co.
Chicago, Ill., Automatic Heating & Cooling Supply Co.
Chicago, Ill., H. W. Blythe Co.
Chicago, Borg-Warner Service Pts. Co.
Chicago, Ill., H. Channon Co.
Chicago, Ill., Fred C. Kramer Co.
Cincinnati, Ohio., The Merkel Bros. Co.
Cincinnati, Ohio, Williams & Co., Inc.
Cleveland, Ohio, Harry Alter Co.
Cleveland, Ohio, Williams & Co., Inc.
Dallas, Texas, Electromotive Co.
Davenport, Iowa, Republic Electric Co.
Detroit, Mich., J. M. Oberc, Inc.
Detroit, Borg-Warner Service Pts. Co.
Fort Wayne, Ind., H. J. Schroeder Co.
Ft. Worth, Texas, McKinley Refrigeration Supply Co.
Ft. Worth, Texas, The Shield Co.
Houston, Texas, D. C. Lingo Co.
Houston, Texas, Walter Refrigeration Supply Co.
Indianapolis, F. H. Langsenkamp Co.
Kansas City, Mo., Forslund Pump & Machinery Co.
Kansas City, Mo., Burstein-Applebee Co.
London, Ont., Canada, Refrigeration Supplies Co., Inc.
Madison, Wis., Gustave A. Larson Co.
Memphis, Tenn., United Refrigerator Supply Co.
Milwaukee, Refrigeration Specialty Co.
Minneapolis, Minn., Refrigeration & Industrial Supply Co.
New Orleans, La., The Spangler Co., Inc.
New Orleans, La., Enochs Sales Co.
New York, N. Y., A. P. Miller Supply Co., Inc.
New York, N. Y., Airo Supply Co.
New York, N. Y., Harry Alter Co.
New York, N. Y., Paramount Electrical Supply Co.
New York, N. Y., Servicemen Supply Co.
Oklahoma City, Mideke Supply Co.
Philadelphia, Pa., Victor Sales Corp.
Pittsburgh, Pa., William M. Orr Co.
Pittsburgh, Pa., Williams & Co., Inc.
Richmond, Va., Refrigeration Supply Co.
Rochester, N. Y., Pfaudler's Refrigerator Parts
St. Louis, Mo., The Spangler Co., Inc.
St. Louis, Mo., Harry Alter Co.
St. Louis, Mo., Brass & Copper Sales Co.
St. Paul, Minn., Thermal Service Co.
San Antonio, Texas, Westbrook Carburetor Electrical Co.
Springfield, Ill., United States Electric Co.
Springfield, Mass., C. P. Payson Co.
Syracuse, N. Y., Syracuse Equip't Co.
Syracuse, N. Y., Syracuse Supply Co.
Toledo, Ohio, Heat & Power Engineering Co.
Toronto, Ont., Canada, Davis Automatic Controls Co.
Tulsa, Machine Tool & Supply Co.
Washington, D. C., Refrigeration Supply Co.
Wilkes-Barre, Pa., Radio Service Co.
Worcester, Mass., Standard Supply Co., Inc.

Export Sales Representatives

New York, N. Y., Melchior, Armstrong, Dessau Co. 300 Fourth Ave.

NEW HENRY CATALOGS

Write for new Henry Catalog No. 62, describing our complete line of Dryers, Strainers, large Valves and Service Tools.

Our large Relief Valves and Check Valves, sizes up to 2", for all refrigerants, are described in the new Henry Ammonia Valve and Forged Steel Catalog No. 47.

HENRY VALVE CO.

1003-17 North Spaulding Avenue CHICAGO • ILLINOIS

THE NEWSPAPER OF THE INDUSTRY

AIR CONDITIONING AND

WRITTEN TO BE READ ON ARRIVAL

REFRIGERATION NEWS

Established 1926 and Registered U. S. Patent Office as Electric Refrigeration News
Member Audit Bureau of Circulations. Member Associated Business Papers.

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TWENTY CENTS PER COPY

'Don't Rap, Sell' Utility Speaker Warns Dealers

Revival of Basic Sales Story Needed, Brown Tells EEI Meeting

CHICAGO—Fourth annual sales conference of Edison Electric Institute, meeting last week in the Edgewater Beach hotel, scanned the appliance merchandising skies and heard a warning to refrigerator retailers, a request for closer cooperation between manufacturers and merchandisers toward a more intelligent appliance distribution, and a prediction that the expected building boom will create a $3,000,000,000 annual market for electrical and construction materials.

The warning came from A. A. Brown of Oklahoma Gas & Electric Co., chairman of the E. E. I. subcommittee on electric refrigeration, who declared that refrigerator men had better stop knocking each other's products and return to their basic story—food preservation—or suffer further sales inroads from the gas and ice industries.

Channing E. Sweitzer, managing director of National Retail Dry Goods Association, the conference's only outside speaker, recommended that a council be formed by E. E. I., National Electrical Manufacturers Association, and retailers groups, to prepare and promote a cooperative campaign for "a more intelligent distribution of appliances to meet the needs of a growing consumer market."

Prediction of the $3,000,000,000 building market was made by M. E. Skinner of Niagara & Eastern Power Corp., Buffalo, who said that the amount to which utilities share in this expenditure will be determined by the facilities which they have to offer.

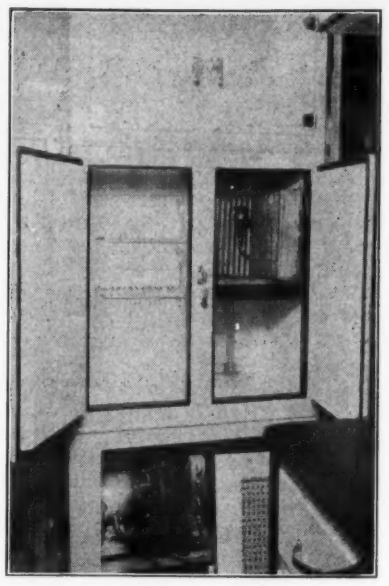
Reports on rural electrification, advertising, and the development and progress of the Kitchen Modernizing Bureau were also made to the more than 400 persons who attended the conference.

In sounding a warning to electric refrigerator merchandisers, Mr. Brown was inclined to pass over the fact that sales had increased yearly, even throughout the depression.

Although 1936 sales showed an increase of 30% over 1935, ice industry sales had increased 20% during the same year, and gas refrigerator sales also jumped sharply upward, he said.

(Concluded on Page 2, Column 1)

Refrigeration to Be Standard in Deluxe Palace Trailers



'Aerflo' trailer refrigeration unit installed in Palace Super-Deluxe model Travel Coach.

* * *

FLINT, Mich.—"Aerflo" refrigeration systems have been adopted as standard equipment in "Super Deluxe" trailers produced by Palace Travel Coach Corp., according to officials of the trailer firm.

Each Aerflo system includes a ½-hp. 12-volt gasoline engine generator to make operation as independent as possible from outside power sources. This generator and two batteries are carried in the rear trunk of the trailer.

Construction and operation of Aerflo units is completely described in Nov. 18, 1936, issue of the NEWS.

Ranier Made President Of New Indianapolis Dealer Association

INDIANAPOLIS—L. O. Ranier, manager of Banner-Whitehill Co.'s appliance department, has been elected president of the recently organized Indianapolis Electric Appliance Dealers Association.

Other officers elected were: vice president, C. H. Domhoff, manager of Guarantee Tire & Rubber Co.; secretary, R. S. Kiser, Colonial Furniture Co. Besides the officers, members of the board include Hans F. Geiger, Geiger Co.; Paul C. Koehering and E. M. Lawrence, William H. Block Co.; Ralph F. Fisher, Fisher Bros. Electric Co.; Robert E. Sloan, Pearson Co., Inc.

Brooklyn Group Seeks Action on New Price Law

Calls for Contracts from Producers & Distributors; Trade-in Pact Planned

BROOKLYN—A resolution calling upon manufacturers and distributors of branded appliances to enter into contracts with retailers under the Feld-Crawford Resale Price Maintenance Law was passed unanimously by members of Electrical Appliance Dealers Association of Brooklyn, Inc., at their meeting last week.

More than 500 dealers and manufacturers' representatives were present at the meeting, at which August C. Flamman, the association's legal counsel, discussed implications of the act, declared constitutional only recently by the State Court of Appeals.

"At last," Mr. Flamman told the association, "dealers have an opportunity to make a profit through established retail prices."

If it does nothing else, enforcement of the act will eliminate "second story" appliance dealers, who sell from list price schedules at discounts, Mr. Flamman said.

Replying to a suggestion from the floor that retailers might circumvent the law by giving excessive trade-in allowances instead of discounts, the association counsel said that a schedule of allowances would solve that problem. He recommended that such a schedule be drawn.

Some 40 members of the association had been contacted regarding their attitude toward the Feld-Crawford Act before its passage, it was revealed at the meeting, and fully 75% had favored it.

The resolution, while it does not advise that members of the association refuse to buy from companies not signing contracts under the law, does advocate cooperation with those who do sign such contracts.

Attitude of the Brooklyn association as a whole on the Feld-Crawford Law is indicated by the following editorial, which appears in the organization's current bulletin under the heading, "Feld-Crawford Act Now Law":

"Now that the courts have finally decided that the Feld-Crawford Act is constitutional, it has become a law of the State of New York, and is therefore in active force at the present time.

"So it will be clearly apparent very soon just which (if any) manufacturers and distributors are sincere when they say that they wish all consumers to be able to purchase their products at the same fair prices—no matter who they may be.

"No more need manufacturers and distributors complain bitterly that they can't legally prevent chiseling, transshipping, sub-jobbing, footballing, or any other of the variously-

(Concluded on Page 2, Column 5)

Successful Operation of Portable Conditioners in Office Bldg. Reported

SAVANNA, Ill.—Fifteen portable air conditioners were used successfully in the large office building of American Utilities Service Corp. during last summer's 40-day midwestern heat wave, according to a survey recently completed by that company.

Daily temperatures during the heat wave ranged around 100° F. with high relative humidity.

So successfully did the conditioners operate, said K. D. Knoblock, assistant to the corporation's vice president, that employes did considerably more work than would otherwise have been possible. He added that the conditioners were easy to operate, attractive, and very little in the way.

February Sales of 258,500 Units Smash Former Record by 40%

* * *

Pennsylvania Nears Lead In Sales-By-States Tabulation

DETROIT — Smashing by nearly 40% the all-time sales record for the month established last year, American manufacturers of household electric refrigerators sold 258,500 units to distributing outlets in all parts of the world in February, according to estimates made by AIR CONDITIONING AND REFRIGERATION NEWS.

The sales total for February, 1936 (and the previous all-time record for the month) was 186,200 units.

Fifteen manufacturers reporting to the Household Refrigeration Section of the Refrigeration Division of National Electrical Manufacturers Association (Nema) had total world sales to distributors during February of 245,612 units, as compared with 173,196 units in the corresponding month last year.

In the breakdown of the Nema-reported sales by cabinet sizes, the refrigerators in the 6 to 6.99-cu. ft. capacity group were shown to be 39% of the total for February, 1937. In February, 1936, cabinets in this size classification were 32% of the total.

In the sales-by-states tabulation furnished in the Nema report New York, as usual, was first with a total of 24,936 units, but was hard-pushed by Pennsylvania, with a total of 23,965 units. Illinois was third, and Ohio a close fourth.

Refrigerator Association Of N. Y. Protests Gas Co. Allowances on Trade-Ins

NEW YORK CITY—Protest that Consolidated Edison Co.'s $15 allowance on trade-in boxes, nub of a recently inaugurated campaign on gas refrigerators, would result in unsound business practices among appliance dealers was made by the Refrigerator Association of New York in a telegram to Floyd L. Carlisle, the utility's board chairman.

Postponement of operations and withholding of advertising in connection with the drive was asked in the telegram.

Opened last week, the gas refrigerator campaign has a quota of 5,000 unit sales during April, to be sold through cooperating dealers and utility offices. More than 115 utility-approved dealers entered the drive last week, as did several Manhattan department stores.

Consolidated Edison, it is understood, does not intend to change its original $15 trade-in offer, and members of the New York association are said to be planning further action in an effort to halt granting of such high allowances, which they consider detrimental to their interests.

Readers' Digest Article Spurs Reorganization Of Detroit Dealers

DETROIT, April 5—First steps in the reorganization of Detroit Appliance Dealers' Association were taken today when about 15 representatives of local retail appliance outlets met at Hotel Webster Hall to discuss future activities of the group.

Formation of the Detroit group is due largely to the influence of a recent "Readers' Digest" article entitled, "Only Saps Pay Retail Prices," some dealers declared. The author of the article declared that electric refrigerators are one of a number of household items obtainable at greatly reduced prices—and made the claim that he himself had obtained one at a substantial discount.

Remnants of the old dealer association here, which has been inactive for some time, are being gathered into a new organization which will form another link in the state-wide activities of Michigan Appliance Dealers' Association. Cooperation of all dealerships throughout the state, regardless of size, is considered essential to elimination of certain evils said to exist in local appliance merchandising.

Dealers of Grand Rapids, Muskegon, Freemont, Grand Haven, Lansing, Jackson, and Flint have already organized, while formation of similar groups is under way at Kalamazoo, Saginaw, Battle Creek, and Bay City.

Allentown Bureau to Give Away Three Kitchens in Contest Promotion

ALLENTOWN, Pa.—To create public interest in kitchen modernization, three electric kitchen and 50 appliaces will be given away in a guessing contest promotion by Allentown Electric Kitchen Modernizing Bureau, recently organized by 30 local electric dealers and contractors. The contest began Feb. 22, will close May 1.

Guessing is to be done on the cost of appliances in each of three modern electric kitchens, illustrated in a booklet distributed to every home in the city. Cost of appliances used in kitchen No. 1 ranges from $900 to $1,100; kitchen No. 2, $700 to $900; kitchen No. 3, $500 to $700.

Complete price schedules for each kitchen were deposited in a local bank, and the three entries that most nearly coincide with them will receive an electric kitchen, completely installed. Next 50 nearest entries win appliances.

In conjunction with the contest, the bureau is recommending use of its planning experts to all persons contemplating changes in kitchens or about to build new homes.

Officers of the local bureau are: Charles E. Oakes, chairman; P. T. Letcher, treasurer; and Roy Heffelfinger, secretary.

Norge Distributor's Air-Conditioned Building Boosts Staff Efficiency & Customer Goodwill

DETROIT — Increasing staff efficiency and the odds for customer susceptibility, Radio Distributing Co., Norge distributor here, illustrates the value of one of its own products in the air-conditioning setup installed in its new headquarters building at 100 Selden Ave.

The building itself is 30 ft. by 170, two stories high. Its porcelain and glass exterior was introduced in the World's Fair House in Chicago. Porcelain enamel on steel backed by light-weight concrete blocks insulate and fireproof the walls. Four-inch Rock Wool is layered in the ceilings. Vacuum-plate glass blocks complete the facade.

First floor is divided into two large rooms—the sales floor in front and a shipping and receiving room in back—and six smaller rooms. There are only three windows to be considered in the air-conditioning load computations for this floor: two large front show windows, 8 ft. by 7, facing south, and one window in the refrigeration testing room at the rear, facing north.

Second floor comprises 14 small rooms and an auditorium seating 100. Nineteen windows line the south, east, and north walls.

Auditorium display room, in use consistently through the week, must be reckoned for full-time conditioning. Chairs are not fixed and are off the floor except when needed. Six windows face east; the three north windows are blanketed behind drapes flanking the stage and its appliance display.

"Thanks to air conditioning and the complete appliance setup that we can afford dealers and their prospective customers here," said L. F. Hock, radio salesmanager, "the auditorium is in use all the time.

"It hasn't missed a night of occupancy since Jan. 15. Distributors, dealers, their salesmen and their customers are our most consistent users. The store officially closes at 5:30, but we seldom close the auditorium before 11 o'clock at night."

The year-around air-conditioning system was installed by Radio Distributing's engineer, L. W. Hinman.

The 15-ton cooling system consists

(Concluded on Page 2, Column 4)

Survey in Tribune Tower Demonstrates Benefits Of Air Conditioning For Office Employes

CHICAGO—A survey conducted in the Tribune Tower by J. P. Kreutzer, head of the Chicago Tribune Employes' Benefit Plan department, before and after installation of air-conditioning equipment, has demonstrated the value of air conditioning in cutting down the number of days lost due to employe illness.

The survey showed that, during the year previous to the air-conditioning installation, 475 of the Tower's 2,150 employes missed one or more days of work because of various respiratory diseases. A total of 2,228 days were missed, an average of about five days each for those who became ill, or 1.04 days for each person employed.

Despite the addition of 350 employes during the first year of the system's operation, only 345 missed work because of illness. The total of 1,290 days lost resulted in an average of slightly more than three and one-half days per person who became ill, or .52 of a day for each person employed.

In other words, the survey tends to indicate that air conditioning saves the employer of salaried labor about 50% in days lost through illness. This is in addition to the saving incurred through increased employe efficiency.

Dr. Irving S. Cutter, dean of Northwestern University's medical school and health advisor of the Tribune, credits the excellent health record of Tribune workers as due largely to air conditioning.

Refrigeration Men Selling Gadgets, Not Safe Food Protection, Brown Declares

(*Concluded from Page 1, Column 1*)

If electric refrigerator men were doing the best type of job, he asserted, ice and gas refrigerator sales would not have registered gains during the year, notwithstanding better business conditions.

From the utilities' standpoint, amount of revenue from use of electric refrigerators had not increased during the year, despite the higher sales figures, he pointed out, crediting this to increased efficiency and lower power rates.

REAL STORY FORGOTTEN

The electric refrigeration industry has strayed far away from the tenets of its cooperative campaign of 10 years ago, the basic idea of which was food preservation, Mr. Brown said. Recalling this campaign, pushed cooperatively for three years, he traced the history of refrigeration down through the gadget era and into that of the most recent development: guarantees.

Although manufacturers in the past have developed some highly effective merchandising programs, during the past three or four years they have concerned themselves almost solely with selling gadgets and guarantees, Mr. Brown declared.

As a result, electric refrigerator's basic story—food preservation—has apparently been forgotten, merchandising organizations being content to teach their salesmen to sell their units' exterior features and conveniences, rather than its intrinsic value in preserving food.

AUTOMOBILE TACTICS CITED

Electric refrigerator salesmen might take a valuable lesson from the automobile industry, Mr. Brown said.

"Automobile salesmen recite the advantages of their own make of car. They don't knock competitive makes in a way that makes the prospective purchaser feel that perhaps he'd better not buy a car at all," he pointed out.

His argument was that this uncertain feeling in the prospect's mind is being developed today by many persons selling electric refrigerators.

"We're getting more competition from the ice and gas refrigeration industries because we're arguing too much among ourselves," he declared. "Our promotions in the past few years have encouraged the consumer to believe that all mechanical refrigeration will preserve food properly. This just makes it harder to sell electric refrigeration."

PLACE OF UTILITIES

What can utilities do to help? They can develop local programs, and encourage cooperation among retailers in their territory in an effort to cut out objectionable sales practices, Mr. Brown said.

He warned utilities and retailers against succumbing to the "bait" advertising of sellers of gas appliances. Some of this advertising, he said, is designed to arouse electric refrigerator merchandisers to the point of combatting them in public print, and only serves to call more attention to gas appliances.

Consultation of Better Business Bureaus and newspapers, he said, will prove more effective than an advertising war over gas refrigerator claims.

In closing, Mr. Brown suggested that electric refrigerator men follow the example set by dealers in Kansas City, Mo., where a cooperative advertising and salesman-training program was worked out between retailers and the utility.

Salesmen learned not only to sell their own make of refrigerator, he said, but to talk intelligently as well on electric refrigeration and food preservation. The utility furnished lists of non-owners of refrigerators to all dealers cooperating in the work.

UTILITIES COMMENDED

In recommending a cooperative program between utilities, manufacturers, and retailers, Mr. Sweitzer commended utility companies for their pioneering efforts in creating demand for new appliances, which, he said, benefits retailers greatly.

He took a stand, however, against utility merchandising of already accepted appliances unless done on the same basis as regular retailers. Department store merchandising of electrical appliances is being done today on a more intelligent and aggressive plane than ever before, he said.

There is still room for improvement, he added, calling attention to the current N.R.D.G.A. survey now being conducted to that end.

POTENTIAL MARKETS

Calling attention to the electrical industry's potential in the building market, Mr. Skinner emphasized that utilities must either see that new homes are adequately wired or be satisfied with less appliance business.

Selling appliances in a complete "package," he said, is much easier than selling them piecemeal, in the case of new homes. In addition, the selling cost is lower.

Use of electricity in the average house during 1936 was 719 kwh., compared with the 6,500 kwh. which an all-electric home would use, he pointed out. Even with electric water heating eliminated, such a modern home would use 3,000 kwh. annually, he said.

'FIVE-STAR' SELLING

Niagara & Eastern Power Corp., Mr. Skinner said, used a "five-star" program to make the public electric-home conscious:

1. Wired for the future; 2. Lighted for eye comfort; 3. Planned kitchen, fully equipped; 4. Automatic hot water; 5. Inside weather control.

He told of his company's plan to erect three homes—in Syracuse, Albany, and Buffalo—and of the questionnaire survey of 25,000 electricity users, which revealed that all the home owners' "musts" cannot be put into a home in the moderate-price class without compromise.

The way out for the electrical industry, he said, is to get contractors and home builders to consider adequate major appliances more important than some other items.

Emphasis should be placed on the new building market, he said, because if new home owners lead the way, owners of existing residences (in which the installation is more expensive) will follow.

RURAL ELECTRIFICATION

Successful rural electrification cannot be done on a wholesale basis, A. C. McMicken of Portland (Ore.) General Electric Co. told the conference. It can be accomplished only by the gradual work of a trained organization, he said. Portland General Electric has had its rural program in operation since 1914.

"Rural electrification is with us with a vengenace," Mr. McMicken said, "aided and abetted by persons who know very little about it."

Private utilities, by working slowly, have done a good job with rural electrification, he said, but added that "it appears, however, that utilities will be forced to extend their rural programs, without consideration of costs."

ELECTRIC KITCHEN PROGRAM

Work of the E. E. I. Kitchen Modernizing Bureau in stimulating sales of appliances and of all-electric kitchens was outlined by George E. Whitwell of Philadelphia Electric Co., chairman of the bureau.

Sixty-two per cent of New England homes are now being wired for all-electric kitchens, he said; in the far West a 40% saturation exists; and in Brooklyn, cooperation between the utility and a bank turned useless real estate into profitable apartments with kitchen modernization.

Kitchen modernizing bureaus are now operating in 61 cities, Mr. Whitwell said, and in 29 others cooperative campaigns are about to be inaugurated.

K. M. Robinson of (Boise) Idaho Power Co. urged a two-months' electric water-heater promotion during 1937, even if only among utility employes, and predicted that this year's sales would double those during 1936.

D. M. DeBard of Stone & Webster Service Corp., New York City, chairman of the E. E. I. sales committee, reported that the finance sub-committee of the group is attempting to have all financing of appliances done exclusively by finance companies and banks.

This move, if brought about, will leave manufacturers and distributors free to concentrate their efforts on the production and distribution of electrical appliances, without the worry and trouble of carrying finance paper, he said.

Two campaigns are planned for small appliances, and another for hot water heaters, Mr. DeBard noted, while the electric range subcommittee has worked out a cooperative program, but is without funds with which to carry it out.

Dilgarde to Retail Leonard And F-M in Dayton

DAYTON — Dilgarde Distributing Co., Inc., recently opened here as a retail dealer in Fairbanks-Morse and Leonard refrigerators. Formal opening will be held near the end of the month, according to Clayton V. Dilgarde, president and general manager.

Herbert Tettman is the distributorship's sales manager in charge of electric refrigeration; Ralph Zubrod is departmental sales manager.

Killian Replaces Moore-Bird

DENVER—Tom Killian, Inc., has replaced Moore-Bird as Crosley distributor in Colorado and parts of New Mexico, Wyoming, and Nebraska.

Officials of the corporation are: Tom Killian, president, and Edward Klippi, vice president.

5 Ohio Leonard Dealers Named

TOLEDO—New dealers recently added by Electric Range & Equipment Co., Leonard distributor here, include Day Lester and Ralph Cooper, Defiance, Ohio; Leffler Furniture Co., Delphos; Home & Office Supply Co., Tiffin; and L. Goodson, Toledo.

Spear Furnishes Model Home

PITTSBURGH—Spear and Co. furnished a model home at Lincoln Ave. and East Liberty here with a Norge refrigerator and other Norge household appliances. The home was opened for inspection on Mar. 7.

Bonney Opens New Store

FAIRFIELD, Conn.—Bonney Electric Co., Frigidaire dealer, whose store here was destroyed by fire early in March, is rebuilding on the Boston Post Road. The new store is expected to open early in April.

Radio Distributing Co. Conditions Offices

(*Concluded from Page 1, Column 2*)

of a Norge 3-cylinder water-cooled reciprocating compressor, powered by a 15-hp. 3-phase 220-volt 60-cycle motor. It is installed against the elevator shaft in the shipping room on the first floor; there is no basement.

Copper cooling coils run in 6 rows and 4 banks, and are equipped with 4 expansion valves. Coil surface is 10 sq. ft. with 6 fins to the inch. Baffle plates back up to coil, catching and draining off the condensate.

Suction and liquid lines running from the compressor to the coils are insulated with Hair Felt.

The control panel is set on the elevator-shaft wall. Controls are Julien P. Friez and Minneapolis-Honeywell, fully automatic.

The heating system comprises two Norge Fine-Air units in multiple. They are oil-fired, producing 190,000 B.t.u.'s each at 5,000 c.f.m. Four Arco filters clean the air coming in from the fresh-air intake on the roof.

Air is 30% fresh with each circulation, 70% recirculated, summer and winter.

The fuel reservoir holds 2,000 gallons of oil, checked by a Levelometer Gauge.

Both systems feed alternately into the main duct rising between the elevator shaft and the east wall. Quadrant dampers with complementary control dampers regulate the flow of both heated and cooled air at all branch outlets. Ducts are buried in walls and ceiling, and are insulated with Balsam Wool.

Outlets throughout the system number 32, and have 20% downdraft deflection. The supply outlets are registered in the sidewalls, with return grilles in the baseboards.

"The staff used to take an hour for lunch in summer," declared E. A. Bertrand, inside salesman. "Now they're back in 20 minutes."

Porter Named Assistant to Gilbert at Belding

GREENVILLE, Mich.—Ralph Porter, formerly with the O. Hommel Co., Pittsburgh, has been appointed assistant to H. F. Gilbert, enameling superintendent of Gibson Electric Refrigerator Co. here. His headquarters will be at the Belding plant in Belding, Mich.

Stevens Heads Crosley District

CINCINNATI—C. J. Stevens, of Des Moines, has been named district manager for Crosley Radio Corp. in Iowa, Illinois, and Nebraska.

Jackson F-M Dealer Moves

JACKSON, Miss.—Appliance Sales Co., local Fairbanks-Morse dealer, has moved to new quarters at 115 W. Capitol St.

A more centralized branch office has been opened by this firm in the Heidelberg hotel.

18 Potter Sales Average $288

READING, Pa.—First 18 electric refrigerators sold by Blimline's, Inc., Potter dealer here, averaged $288.40 in retail price, reports Leon S. Blimline, president of the company.

Brooklyn Dealers Ask Price-Law Adherence

(*Concluded from Page 1, Column 3*)

named schemes to kid the customers into believing that they benefit by buying through others than regularly established retail merchants.

"No more need manufacturers and distributors complain bitterly that they can't legally stop selling at wholesale prices to others than regularly established merchants.

"No more need manufacturers and distributors complain bitterly that they can't legally enforce their own fair sales policies.

"They can—Now!"

Text of the resolution urging manufacturer-distributor use of the Feld-Crawford Law reads in part as follows:

"Whereas, the said Feld-Crawford Resale Price Maintenance Law has among its purposes the protection of the manufacturer, distributor, and retailer in the sale of commodities bearing a trademark, brand, or name, to stop the 'assault upon the goodwill' established thereby and to discontinue price cutting by the retailer which is not alone injurious to the distributor but to the fair dealing retailer and the public; and maintains sound American business principles and standards.

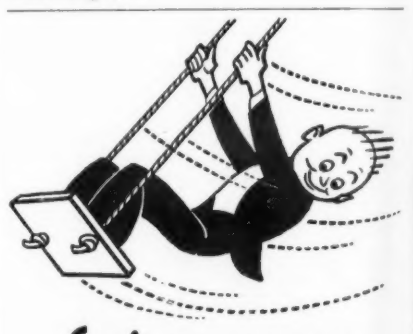
"Now, therefore, be it

"Resolved, that we, the members of the Electrical Appliance Dealers Association of Brooklyn, Inc., representing the majority of the retailers of commodities within our field, and representing, by far, the greater majority of sales of such commodities in our territory, do hereby approve the provisions of the said Feld-Crawford Resale Price Maintenance Law, and the purposes thereof, desiring to achieve its benefits as promptly as feasible, do hereby call upon and request all manufacturers and distributors, selling to and through us trademarked, branded, or named commodities, that they forthwith enter into contracts maintaining a fair price; and that we hereby pledge our consent and acceptance of such contracts carrying out the the spirit and purpose of said law, and we do further

"Resolve, that the assistance of this Association be given such manufacturer or distributor in utilizing the provisions of the Feld-Crawford Resale Price Maintenance Law, and that such manufacturer or distributor shall be extended not alone our appreciation, but active sales cooperation."

Handles Crosleys in Tampa

TAMPA, Fla. — Appointment of Tampa Radio Sales as Crosley dealer has been announced by Johnson Distributing Co.



Swing OVER TO
SURE PROFITS!

No Repair Problems To Worry You With COOLERATOR!

Every time you sell a Coolerator, you keep the *entire* profit on that sale. You never need spend a penny of it for service. For this amazing air-conditioned ice refrigerator has no machinery, no moving parts to get out of order. What's more Coolerator is easy to sell. Here's why:

● **PRICED LOW:** Big family size only $79.50. Others as low as $39.75.

● **NEW FEATURES:** Completely air-conditioned . . . no danger of mingling food flavors . . . no rapid drying out of foods . . . beautiful "swingline" cabinet . . . ice cubes in 5 minutes.

● **PROVEN SUCCESS:** Backed by powerful national advertising, already more than 300,000 Coolerators have proud owners.

● **COMPLETE LINE:** From compact 2½ cubic foot size to spacious 50 cubic foot commercial model.

Want more facts? Write, wire, phone:
The COOLERATOR CO., Duluth, Minn.

Swing OVER TO
Coolerator
The Air Conditioned Refrigerator

"Refrigeration? You couldn't sell us anything BUT Copeland. My own experience has shown me which is the best."

Hotels, restaurants, soda fountains, dairies—wherever economical, trouble-free refrigeration is vital, you'll find Copeland enthusiasts.

Write for our Sales Plan

COPELAND
REFRIGERATION CORPORATION . . . DETROIT, MICHIGAN

Here's a Market that is Ripe for Picking

★ Your market for door gasket replacements is there, ready and waiting. Every refrigerator 5 years or more old is in need of this service. Efficient, economical refrigeration depends on it. The business is yours for the asking.

You have no product problems because Miller has already solved them. From their simplified line of 20 gasket types, you can service 80% of all refrigerators, regardless of make. Immediate delivery eliminates necessity for carrying large stocks.

Someone is going to get this profitable business. It might as well be you. Send for illustrated price list. If not available through your local jobber, write direct.

THE MILLER RUBBER COMPANY, INC., AKRON, OHIO

IMMEDIATE DELIVERY
Miller
"Engineers in Rubber"

You'll make more money with C. I. T.

C. I. T. BUSINESS BUILDER

The localized national finance service

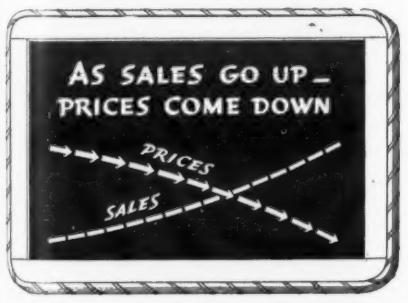
Vol. 1. No. 2 Published by C. I. T. Corporation, unit of Commercial Investment Trust Corporation, capital and surplus over $100,000,000 APRIL 1937

Leading C. I. T. Manufacturer and Distributor Clients Offer Dealers Limited Recourse Retail Finance Plan

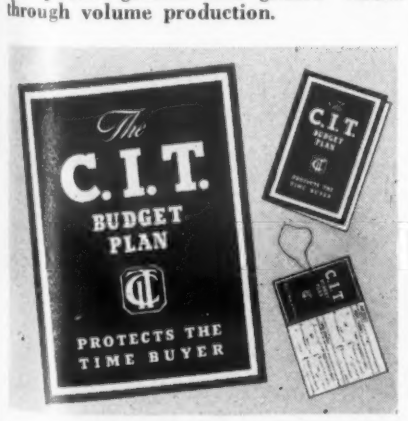
C.I.T. Consumer Advertising

Here is the C.I.T. full-page advertisement which appears this month in Saturday Evening Post, Collier's and Time. This good-will advertising is designed to explain instalment financing and to build business for the dealer who uses C.I.T. service.

SIMPLE AS A.B.C.



The average American is quick to understand basic economic principles once they are explained in simple terms. C.I.T. has condensed the theory, soundness and value of instalment selling in the illustration shown here. It's as simple as A.B.C. and is used in all C.I.T. magazine advertising. This little slate, like you used in the old red schoolhouse, reminds people that instalment purchasing by millions of families (a) makes possible electric refrigerators, radios, and other appliances at moderate prices (b) enables industry to give the public greater and greater values through volume production.



The poster shown here

is proving immensely popular with appliance dealers the country over. It is also offered with easel back for counter use and in small size as a window sticker. Door handle cards as shown above and the consumer booklet with cover design similar to the poster can also be secured from the C.I.T. branch office nearest you.

"... C.I.T. service has always clicked"

—says a Western Dealer

". . . Your first real help was given me in 1922 in Anaconda, Montana, when my business was expanding. Again in 1924 in Butte, Montana, you gave me draft privileges at a time when western Montana was infected with bank failures. I am sure you realize the local prestige and assistance this privilege gave me.

"Over many years of business dealings, C.I.T. has always 'clicked' with me."

The Question Box

Q.—To take advantage of combination sales financed by one contract must both items be bought at the same time?

A.—No. A customer who several months ago bought a refrigerator, for example, can come back and purchase another appliance and add it to the refrigerator contract, in this way taking advantage of the long maturity.

Q.—Is it advisable for the user to finance the purchase of low-priced appliances?

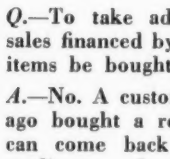
A.—Generally not. Because the fixed costs of credit investigation, accounting and handling are the same for a $25.00 balance as for a $150 balance and the service charge for the smaller balance must reflect these fixed costs. Hence the charge seems high to the small appliance buyer.

Q.—What is the most economical way to finance the purchase of a low-priced appliance?

A.—Lower priced items often can be included in a contract for a larger item, financing the combined balances as one transaction.

Q.—In the case of appliances sold on the Limited Recourse Plan do dealers generally maintain the same interest in the customer after their four months liability?

A.—Yes. Because friendly relations with satisfied users is the most prolific source of dealers' leads.



The Philosophy of "DEALER DAN"

Most people *know* what they want when they come in to buy—but it's up to you to show them *how* they can buy without feeling the strain. C.I.T.'s Budget Plan is the answer, of course.

* * *

To insure the "outgo" of your merchandise—you've got to tell your customers how they may make purchases out of "in-come."

* * *

In using the Limited Recourse Plan I find it smart never to "limit" my interest in a purchaser throughout the duration of his contract. Satisfied friends mean good leads.

Dealers find four important advantages

ONE of the outstanding recent developments in appliance financing, most appliance dealers now agree, is the new Limited Recourse Retail Finance Plan offered by leading manufacturers and distributors through C.I.T.

This plan relieves the dealer of contingent liability after the first four monthly instalments on the purchase of a household appliance have been made. (Commercial installations are not included.) It operates *without cost to the dealer.*

In the opinion of representative dealers, the Limited Recourse Plan has four major advantages:

First: because the finance company relies on the dealer's endorsement only until the first four instalments are paid by the purchaser, the finance company's requirements for dealer quick assets are much lower than formerly.

Second: as a result of this lowering of dealer credit requirements, many dealers who formerly were unable to qualify for financing service through a strong national finance company, are now able to secure such valuable financing accommodation.

Third: because there is no pyramiding contingent liability resulting when a dealer does a large volume of business, this permits the dealer to show his bank and suppliers a better financial statement and entitles him to more finance credit.

Fourth: there is no holdback to tie up profit. The dealer receives 100% cash advance at once. His capital remains fluid; his current assets increase and are not frozen beyond immediate reach.

They Have a Name For It

In England, instalment buying is known as the "hire purchase" system. It is widely used although not as extensively as in this country.

One of the reasons America leads the world in enjoyment of such conveniences as automobiles, radios, electric household appliances, etc., is that sound instalment buying enables almost everyone to purchase the new contrivances. Thus they can be manufactured on a large scale and sold at reasonable prices. "As sales go up....prices come down."

You Can Go 'Limited Recourse'

Leading radio, refrigerator and appliance manufacturers have worked out the Limited Recourse Retail Finance Plan for your benefit. They have selected C.I.T. to operate it for you. Through this plan you find it possible to concentrate on selling without having to worry about the mounting contingent liability which, under other methods, would result from an increase in sales.

The Limited Recourse Plan is simply a new and additional financing service designed to meet the requirements of those dealers who prefer to limit their contingent liability. However, the Full Recourse Plan is still active and is being used by large and small dealers alike, just as heretofore.

Plan Proves Popular

Appliance dealers both large and small have been quick to see the merit and to take advantage of the new plan. Enthusiastic comment by many dealers, distributors and manufacturers interviewed is evidence that the plan has already successfully served the constructive merchandising purpose for which it was designed. Ask your local C.I.T. office for complete details of the Limited Recourse Plan.

PHONE OR WRITE—quick, personalized service through the C.I.T. branch nearest you. These 160 local offices are manned by staffs that render a complete localized finance service — investigating credits, buying paper, making collections.

AND YET COMPETITORS SAY BROWN IS "JUST LUCKY" *by Agnew*

"I AM TO PAY $7.50 A MONTH, IS THAT RIGHT, MR. BROWN?"
"YES, MRS. SMITH. WE CAN SPREAD THE PAYMENTS FOR THIS REFRIGERATOR OVER 36 MONTHS."
"WE WANT A NEW RADIO, TOO, BUT WE DECIDED TO GET THE REFRIGERATOR FIRST."
"WHY NOT COMBINE BOTH ON THE SAME CONTRACT? THAT GIVES YOU 3 YEARS TO PAY."
"COULD BOTH GO TOGETHER? AND SPREAD OVER 3 YEARS?"
"ABSOLUTELY. COMBINE YOUR UNPAID BALANCES OF $215.00 AND $75.00. THAT BRINGS YOUR MONTHLY PAYMENT TO $9.50"
$9.50 MONTHLY FOR RADIO AND REFRIGERATOR? WHY THAT'S WONDERFUL!
"IT CERTAINLY IS. TAKE ADVANTAGE OF C.I.T.'S COMBINATION PLAN."
NEXT DAY
"I BOUGHT A RADIO AND AN ELECTRIC REFRIGERATOR TOGETHER FROM BROWN'S—ONLY $9.50 A MONTH."
"SAY, I NEVER HEARD OF THAT. I'M GOING INTO BROWN'S MYSELF."
"WE'VE BEEN WANTING TO GET AN ELECTRIC REFRIGERATOR."
"I WANT TO SEE THE NEW WASHERS—IF WE CAN BUY THEM THAT EASILY."
Take a Tip from Brown
"On combination sales, the appliance allowed the longest maturity determines the maximum maturity of the transaction. I use that to increase business."

C. I. T. CORPORATION NEW YORK • CHICAGO • SAN FRANCISCO

Utility Promotes Ranges with 'Heaven from Pennies' Theme

COSHOCTON, Ohio — Capitalizing on the publicity given to the Bing Crosby movie "Pennies From Heaven" when it was shown here recently, the Ohio Public Service Co. built a window display in which the catchy movie title, reversed to read "Heaven From Pennies," was used to put across the economy of electric range cookery.

The display was centered by an electric range. Giant posters on either side urged the housewife to bring "heaven" into her kitchen with a few extra pennies spent daily for electricity.

Pennies hanging from the ceiling and scattered around on the floor of the display window also served to tie-in the movie title with the advertising message.

Delivery Trucks Help Gable Salesmen Cover Territory

HARRISBURG, Pa.—Gable's Hardware Store, new General Electric dealer, has placed six panel delivery trucks at the disposal of its 10 salesmen for use in merchandising refrigerators and appliances within the 30-mile radius which the company covers. Two service men have also been added to the store's staff.

Three Minnesota Utilities Sign EH&FA Finance Agreements

MINNEAPOLIS—Contracts for cooperation in financing sales of electric appliances have been signed between Electric Home & Farm Authority and Midland Public Service Co., St. Croix Falls Minnesota Improvement Co., and Elizabeth Light & Power Co., all with main offices here.

New General Electric Dealer Opens in Greenville

GREENVILLE, S. C.—Gower, Hammond, & Pierson, Inc., new General Electric dealership at 311 South Main St. here, held its formal opening recently.

Officers of the new firm are: S. M. Pierson, Jr., president and general manager, T. Charles Gower, vice president, and C. Kirby Hammond, secretary and treasurer.

Buhl's Finds Frequent Dealer Sales Bulletins Effective

DETROIT—Buhl's Sons Co., Leonard distributor in this territory, has found that brief but frequent dealer bulletins serve as the most effective stimulus to dealer sales, according to C. W. Strawn, manager of Buhl's major appliance department.

— WHAT DEALERS ARE SAYING & DOING —

Season Starts Slowly for Long Island Dealers, But They See Indications Which Point to a Good Year

By T. T. Quinn

LONG ISLAND CITY, N. Y.—Electric refrigerator dealers in this section of the New York metropolitan area were looking forward to increased business this year, despite the fact that January-February sales were little, if any, ahead of the same period of 1936.

A general air of optimism exists. Dealers feel that there's more money in circulation than there was last year, and are counting on the National City Bank's 5% financing plan to help them close time payment sales.

Price structure, in general, is firm, although one or two dealers are concerned over the "specials" offered from time to time by the chain appliance stores operating in the territory, and would welcome any effort tending toward stabilization of activity in this regard.

Here, as elsewhere, good salesmen are at a premium. One dealer offers men a salary of $25 a week and commission of $5, but the rest stick to a straight 10% commission plan.

Electric range sales have been disappointing, and most dealers hold scant hope that anything will—or can—be done about it this year. New York & Queens Electric Light & Power Co., public utility operating in the territory, has inaugurated an intensive campaign on ranges, but hasn't extended its range plan into the Long Island City district.

Until this, or something like it, is done, most dealers are not inclined to push ranges independently, seeming content to sell 15 or 20 units a year and concentrate their efforts on refrigerators, for which a demand has already been created.

Palmer's 'Numbers Game' for Users Is Sales Builder

H. W. Palmer, manager-owner of Palmer's Home Electric, Inc., works a "numbers game" on owners in the Long Island City territory—but unlike the usual "numbers" racket, every one who enters the game has more than an even chance of winning.

In fact, there's only a slight element of chance in the whole arrangement. Mr. Palmer has set up a file of owners, and has given every one a number. Then he's given every owner a set of company business cards, with that person's number in the lower left-hand corner.

The game works like this: Whenever an owner comes across a good prospect for a range, refrigerator, or some other appliance which Palmer handles, he gives him one of the cards, asks him to present it when he calls at the store.

Mr. Palmer takes the card, notes the number, and the prospect is credited to the person who has turned him in. If a sale follows, the owner gets a commission equivalent to 2% of the purchase price of the appliance, either in cash or merchandise.

In business for himself only four months, but with several years of appliance selling behind him, Mr. Palmer works on a variation of the time-worn theme: "The more you see, the more you'll sell."

PART-TIME SALESMEN

"Get everybody you can to work for you," Mr. Palmer says. Offer them whatever inducement you want, but be sure it's enough to keep them interested and on the job.

"I've got all sorts of people working for me. The delivery man in the stationery store next-door hunts out prospects while he's on his route, and after working hours; so does the porter in the office building across the street.

"I keep in touch with all my friends, and they give me lots of good prospects, because I make a business of letting them know that I'm selling major appliances 12 months a year, 24 hours a day.

"My four salesmen are instructed to do the same thing. Selling appliances, no matter what kind, isn't a seasonal business. If you go after it right, you can make sales—and profits—every month in the year."

Handling General Electric, Frigidaire, Westinghouse, and Kelvinator refrigerators, Mr. Palmer thinks he's in a good position to get business coming and going.

"I've got four of the best," he says, "and I don't push one at the expense of another. No matter which features the prospect admires, I figure I'm in position to deal with him. I find out what make he's most interested in, and then try to sell it to him."

BUYERS ALREADY SOLD

Prospects' minds are made up, as far as make of refrigerator is concerned, before they ever show up on the salesroom floor, Mr. Palmer believes.

"Why try to change them?" he asks. "You won't gain a lot, and there's always the chance the customer will think your argument is a reflection on his good judgement, and leave without buying anything.

"The customer is always right in his selection of the brand, as far as we're concerned. All we try to do is assist him getting the size and type most suitable for his needs and wants.

"If the prospect won't come out and tell us which brand he's most interested in—and there are still a few coy ones, believe it or not—we quiz around until we find out. But the last thing in the world we want to do is to try to sell him one make of refrigerator when he's already half-sold himself on another.

"We figure that's just making extra work for ourselves."

Husband and wife frequently call together at the Palmer showroom—and when they do, Mr. Palmer talks to the wife, and lets the husband help her listen.

"Always find out what the wife wants," he cautions. "Sell her, and you'll sell the husband. After all, all he has to do is pay for what she buys.

"Sometime, of course, the wife wants one make, the husband another. Then your job's a little harder. But I always work on the wife, and try to get the husband to see things her way.

" 'Take the advice of another married man,' I say, 'and let the missus have what she wants. If you don't, you'll never hear the end of it.' Most men are good natured enough to agree with me."

HANDLING TRADE-INS

The store accepts trade-ins, but Mr. Palmer doesn't want anything to do with selling them. So he's worked out what he believes is a pretty sound system of handling the problem.

He has made arrangements with a used refrigerator dealer to take all his trade-in units, at a price to be agreed on between them. The units never even reach the Palmer warehouse—the used refrigerator man calls for them at the new customer's home and packs them off to his own headquarters, where they're reconditioned and offered for sale.

In trading for used units, Mr. Palmer has instructed his salesmen to make an offer, and try hard to close the deal. He cautions against offering too good a price, and the men listen and follow—because it costs them commission money when they make a bad deal.

The Palmer offer to the customer stands, regardless of what the used refrigerator dealer does about it—but if there's a loss to the company, Mr. Palmer and the salesmen split it evenly between them.

"After a salesmen has $5 or so of his commission on a new sale subtracted for bad trading habits, he's apt to be a lot more careful about what he offers in the future," Mr. Palmer finds.

"After a few such mistakes, the salesman gets to be a pretty good judge of used merchandise. Once he is, both of us do better."

Albanesi Pins Faith on Well-Advertised Makes

Seeing full-line Frigidaire, General Electric, and Westinghouse displays as we entered the small but well-appointed showroom of Alba Electric Co., we naturally asked Owner A. H. Albanesi: "How come?"—and learned something about smart small store operations.

"I've found that most prospects have their minds pretty well made up before they ever come into the store to see a refrigerator," Mr. Albanesi said.

"National advertising today is so powerful and attractive that it does a great deal of pre-selling for any dealer—if he's smart enough to take advantage of it.

"And what advertising doesn't do, contact with satisfied owners does. As a consequence, the prospect has settled on one make before she ever gets into the showroom. About all the salesman has to do is to convince her she's right—and try to sell her a larger unit than she at first intended buying.

"I've got three of the well-known, nationally advertised makes here—and our whole attempt has been to get prospects in this territory to recognize us as headquarters for those brands."

PRACTICAL EXAMPLE

We had to wait a few minutes while Mr. Albanesi finished a demonstration to a husband and wife who were in the showroom when we came in. After they had gone out, he inclined his head toward the door, saying:

"You see, there's an example. Those people came in and asked to see a Westinghouse. I'd never seen either of them before. So they must have sold themselves—probably from reading ads in magazines and talking to Westinghouse owners among their friends.

"Of course, not all prospects identify themselves so readily. I've had cases where it was really a hard job to get the prospect to say which brand he was interested in learning about.

"Most of the time, though, they'll say—and when they won't, the best thing to do is to start out showing a certain make, watching their reaction to your demonstration. If that's not the line, pretty soon the prospect will be shifting his glances over to the make he's really out to see—and you can shift sales talk over there, too."

Alba Electric has been in business for four years. In small quarters, the dealership's windows make up in attractiveness what they lack in size—and the store interior is just what the windows would lead you to expect.

Refrigerators are lined up along both sides of the short showroom, with an electric kitchen display as the back centerpiece. Small appliances are displayed on a small table in the middle of the room.

The store had three salesmen on the job at the time of our visit, and will have at least a half dozen during the height of the selling season, Mr. Albanesi said. The men work on straight commission.

Business conditions in the territory are good. Little pinch has been felt by hard times, and though the majority of the residents aren't wealthy, they have regular pay envelopes coming in, and money to spend.

Price increases had just been announced to dealers as we came along, and Mr. Albanesi was a bit concerned about the possible effect on several prospects he had about ready for signing. Sometimes a difference of $10, he said, holds off a sale longer than you'd think.

PRICE SITUATION CALM

In general, the price situation is pretty well in hand, Mr. Albanesi said. He is concerned, however, about the price selling activities of two chain stores operating in the Long Island City district, and would welcome any regulation, cooperative, mutual, or otherwise, that might give single-store dealers a little more of a break.

Sales in the neighborhood, well ahead of last year, run about 65% time payment to 35% cash, Mr. Albanesi said.

While he has the GMAC plan available with Frigidaire time payment sales, Mr. Albanesi prefers—and he'll tell his customers, if they give him the chance—the plan inaugurated last year by the National City Bank.

National City's plan (a boon to time sales, by the way) permits no down payment with three years to pay—and interest rates are lower each year financing is continued. For instance, rates the first year average 5%. The second year, the average drops to 4.8%, and the third to about 4.7%. GMAC rates are a straight ½% a month on the unpaid balance.

General Electric and Westinghouse ranges—one of each—were on the Alba Electric floor, but Mr. Albanesi says sales have been slow. He can't see much pick-up in the immediate future, either. Utility promotion has done something to stir up interest, he says, but rentals haven't yet been put into use in the territory.

(Editor's Notes More interviews with Long Island dealers will be published in subsequent issues.)

WOLVERINE
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TUBING
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GET IT AT YOUR JOBBERS

MIRROR-CLEAN
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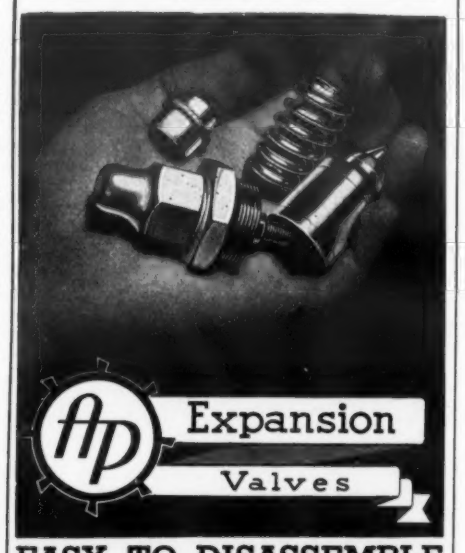
ANNEALED

WOLVERINE TUBE COMPANY
1411 Central Avenue • Detroit, Michigan



EASY TO DISASSEMBLE AND CLEAN

Simply remove large hexagon nut on bottom of valve and parts drop into your hand. A-P Expansion Valves are available in a full range of sizes up to 15 tons "Freon" Capacity, and for all modern low-pressure refrigerants.

Automatic Products Company
2450 North 32nd St., Milwaukee, Wis.

Some people think the all-porcelain enameled refrigerator is "high-priced." That erroneous impression is caused chiefly by the fact that frequently the all-porcelain enameled refrigerator is the deluxe model—equipped with expensive gadgets.

Putting porcelain enamel on the exterior, too, costs only a very few dollars more. So few, in fact, that the trend today is toward all-porcelain.

The public always wants lasting quality. Be sure you give it to them.

PORCELAIN ENAMEL INSTITUTE, INC.
612 NORTH MICHIGAN AVENUE, CHICAGO

PORCELAIN ENAMEL
Finest on Wheels

HIT WHILE IT'S HOT

1 Bring 'em in with HELL'S KITCHEN

The hit of the year . . . an amazing demonstration! Spectacular performance in steaming tropics repeated, right in your store, before your prospect's eyes. Dramatic! Convincing! A real sensation, wherever shown! Available in lifelike "Hell's Kitchen" Hut, or new inexpensive floor display (as shown).

2 Face 'em with FACTS

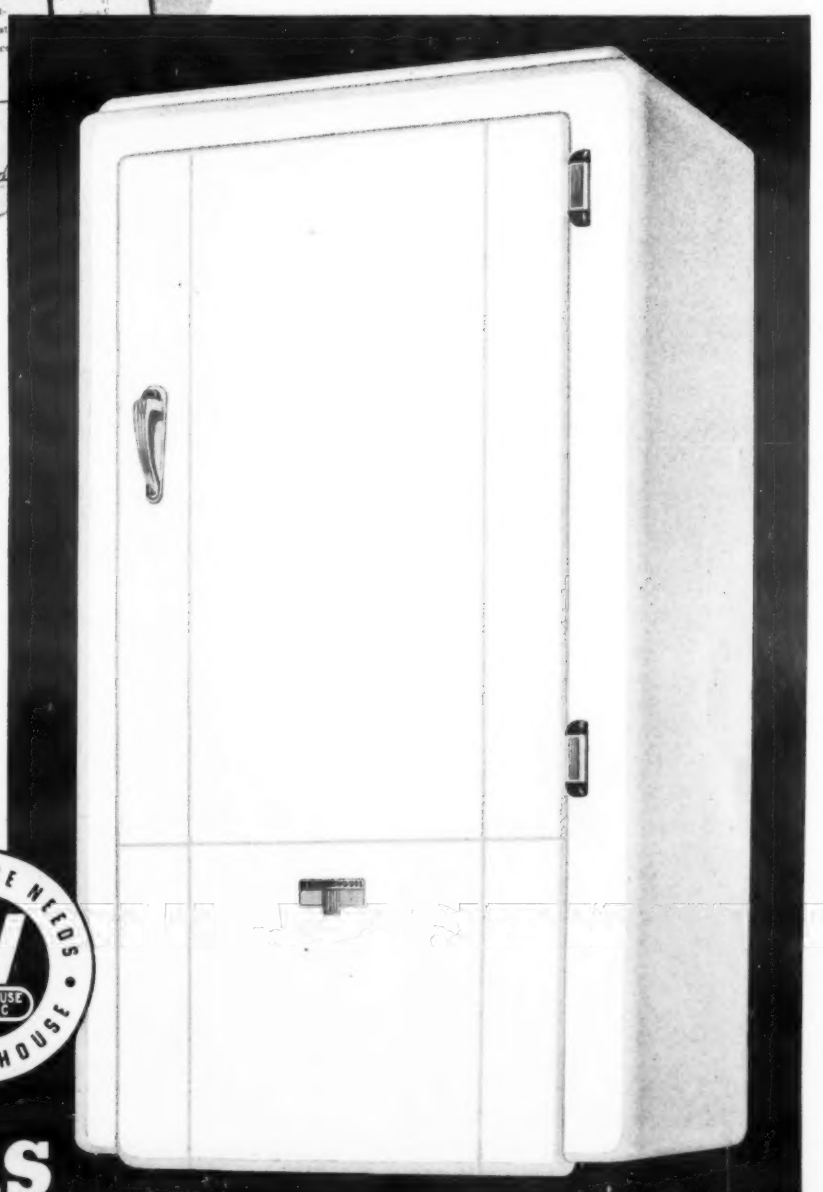
First hand facts! Are your prospects interested in FACTS—about operating costs? FACTS—about running time? F A C T S — about temperatures? FACTS — about food savings? If they are, you can give them FACTS on Westinghouse. They're all here in the "Family Album of Kitchen-proved Savings," the book that contains complete records of all the results from Westinghouse Proving Kitchens in actual homes all over the country. It's the first time a book like this has ever been made available to refrigerator retailers.

3 Clinch the EVIDENCE!

Play up *10-year Economy!* Show how Westinghouse low-cost operation won the largest refrigerator order ever placed — 16,697 refrigerators purchased by the U. S. Public Works Administration for low-rent housing projects.

ACT NOW! for bigger sales this season

You'll have to act fast if you're going to cash in on the big swing to Westinghouse this season. Westinghouse is "going places" — is well on the way! Get all the facts from your distributor, or write direct. Dept. 7250, Westinghouse Electric & Manufacturing Co., Mansfield, Ohio.



Westinghouse

Kitchen-proved REFRIGERATORS

EVERY HOUSE NEEDS WESTINGHOUSE — W — WESTINGHOUSE ELECTRIC

Dairy Installation Uses Variety of Cork Products

WORCESTER, Mass.—A variety of insulation materials produced by Armstrong Corkboard Co. were used in construction of Hillcrest Dairy Co.'s new plant here.

Cold rooms used for storage and handling of dairy products are insulated with two layers of 2-in. Armstrong corkboard laid in asphalt. Ammonia suction lines which are operated at —10° F. are insulated with Armstrong's cork covering and fitting covers in brine thickness.

McCormic Co. of Pittsburgh was architect for the plant. E. T. Pitfield was general contractor.

Dauphin to Handle Frigidaire Commercial in Harrisburg

HARRISBURG, Pa.—Dauphin Electric Co. has been appointed a Frigidaire commercial refrigeration dealer here. The company also holds the servicing franchise for all Frigidaire household units in Dauphin county.

Super-Cold Opens Sales Branch in Denver

DENVER—Super-Cold Corp., Los Angeles display case manufacturer, has opened a sales branch here under the supervision of W. H. MacFarland, formerly field distributor.

—COMMERCIAL REFRIGERATION—

Republic Reports Sales Far Ahead of 1936

DETROIT — Commercial refrigeration sales of Republic Refrigerator Sales & Service here for the first quarter of 1937 are far in excess of the corresponding period of last year, reports Walter A. Dusseau, manager of the company.

"Business is unusually active," said Mr. Dusseau. "We have sold about 36 Curtis commercial refrigerating units during the first three months of the year, most of them to meat markets, groceries, and similar retail stores."

Largest of Republic's recent installations is a 10-hp. Curtis refrigerating machine placed in the Bauer and Bilsky store in Flint. The establishment is a combination confectionery, lunchroom, ice cream and soda fountain.

Four Curtis units have been installed in two Detroit apartment buildings. In the 46-apartment Belmore, 615 Field Ave., Republic put in a 1-hp. and a ½-hp. machine. Two 1-hp. outfits were installed in the Newton Apartments, 628 Delaware Ave.

Republic also installed a 3-hp. Curtis compressor in the Trading Center, general food market at 5901-5903 Livernois Ave.

Five Kroger Refrigerated Trucks Found Effective

CINCINNATI — Five refrigerated trucks used by Kroger Grocery & Baking Co. to deliver meat and perishables to its stores in this territory maintained temperatures between 35 and 38° F. even during the extremely hot weather last summer.

Each body is equipped with two Kold-Hold high temperature units mounted with baffle plates. These units are connected to a central plant ammonia system for a four-hour period every night.

Built by Bide-Finn, Inc., local manufacturer, the bodies are insulated with 3 inches of Dry-Zero and ½ inch of insulation board in the roof, 2½ inches of Dry-Zero and 1 inch of Balsa wood in sides and ends, and 3 inches of Balsa wood in the floor.

Interior measurements of each body are 156 x 78 x 78 inches, and each body is equipped with one side door and double rear doors. All are equipped with Hanson chrome-plated hardware.

Water-Powered System Chills Mountain-Side Storage Room at Camp

BREVARD, N. C.—Hewed out of a mountainside and using natural water power to operate its refrigerating system, a small refrigerated storage room near here is used to keep and furnish ice for Rockbrook Camp for Girls, according to Henry N. Carrier, camp director.

Planned and erected by Mr. Carrier, the 12 x 18 x 9-ft. room was cut out of the mountainside, lined with cement, and thoroughly insulated with rock wool. Power is furnished by a 12-hp. impulse water wheel belted to the drive shaft operating the compressors.

The installation, as first arranged, used a single Merchant & Evans 2-hp. compressor to refrigerate the room through a forced convection coil, and to cool 400 gallons of brine in a home-made 600-lb. ice maker. This setup kept the room temperature at 36° F. and the brine temperature safely below freezing.

Later, another compressor was added. The 2-hp. unit is now hooked up to the ice maker, and will bring the brine down from 20° to 6° or 8° F. in two or three hours running time. The newer unit, a 1½-hp. Merchant & Evans compressor, cools the room to 20° F. in about the same length of time.

Legal Beer Opens Commercial Market in Alabama

BIRMINGHAM, Ala. — With the legalization of beer Mar. 15, increased possibilities for commercial refrigeration business have opened in 24 out of 67 Alabama counties. Birmingham, Montgomery, and Mobile are included in the new beer area.

Since passing of the new legislation, R. P. McDavid & Co., Birmingham Kelvinator distributor, and Helburn Co., Montgomery Frigidaire distributor, have been active in sale of beverage coolers to retailers in the affected counties.

Sunset to Install Equipment In Bremerton Navy Yard

SEATTLE—Sunset Electric Co. has been awarded a $1,447 contract to install refrigeration equipment at the Bremerton navy yard.

Peerless Markets New Evaporative Condenser Unit

CHICAGO—A new evaporative condenser with but one moving part, designed for compressor capacities ranging from 1½ to 25 tons refrigerating effect, has been introduced by Peerless of America, Inc.

The manufacturer claims the new product effects savings of 82% to 96% in water used as compared to the conventional water-cooled condenser. In comparison with the combination of cooling tower and water-cooled condenser, advantages of lower first cost and smaller space requirements are claimed.

In the Peerless design, the water is picked up out of the reservoir in the base of the unit by an extended flange on the fan wheel, so that the water is thrown directly into the air stream already broken up into fine, fog-like mist wihout the necessity of spray heads, or of any moving part except the fan wheel, which also provides forced circulation of air.

This moisture-laden air is distributed evenly over the entire surface of the condenser coils so that the maximum evaporative condensing effect is realized. The latent heat of evaporation of the evaporating moisture absorbs the heat from, and so condenses and cools, the refrigerant gas within the condenser.

Features of design and operation claimed by the manufacturer include:

"One minute" accessibility of entire fan and coil assembly by easily removable panels.

Elimination of moisture from airstream leaving the equipment by efficient eliminator assembly.

Connection provided for supplying cooling water to compressor cylinder heads.

Make-up water float assembly exposed for inspection and repair.

Standard, horizontal, "splash-proof" motor used.

Continuous tinned copper tubing, easily accessible for cleaning, used for all condensers except when designed for ammonia.

"Galvanealed" corrosion-resisting steel construction with attractive green exterior finish.

Packer Puts Two Refrigerated Trucks on Albany-N.Y. Run

ALBANY, N. Y.—Two refrigerated truck units, each capable of carrying five tons of meat and holding a temperature of 36° F., have been put in service between Albany and New York City by Albany Packing Co.

Refrigeration is supplied by a Baker Model TAM 150 mechanical system.

Built by Caley & Nash, Inc., Rochester, N. Y., both bodies are insulated with 4 inches of Dry-Zero Sealpad in the roof, and 3 inches in the sides and ends. The floor is of ½-inch shiplapped oak, laid on hot pitch over 4 inches of cork insulation.

Frick Development Outlined On Newspaper's Anniversary

WAYNESBORO, Pa. — The part played by Frick Co. in the development of the commercial refrigeration industry is outlined in an article printed in the 90th anniversary edition of the Waynesboro *Record Herald*, March 13.

Small-Scale Farm Community Refrigeration Benefits Studied on Farragut Project

FARRAGUT, Tenn.—Benefits of small-scale community refrigeration are being demonstrated here in a project involving several farmers and one storekeeper. The project is sponsored by the University of Tennessee Agricultural Extension Service and the agricultural industries division of the Tennessee Valley Authority.

Farragut had no dependable fresh-meat supply or cold-storage facilities, so, for the preservation of home produce, a $650 walk-in cooler capable of handling the equivalent of 800 to 1,000 lbs. of meat was built into the community store for the use of the six members of a cooperative group, one of whom was the storekeeper.

Cost of operation and maintenance was prorated equally among the members, the storekeeper being repaid for his labor and the space he furnished by the use of cooler space for storing meats sold over the counter.

Beginning last September with only four patrons and a total storage volume for the month of 867 lbs., the use of the cooler grew until by November it had 12 patrons and had handled 2,333 lbs. Total poundage for the three months was 4,306.

The storekeeper is manager of the plant, keeps the books, takes care of the equipment, and weighs produce in and out for all patrons. Space not needed by group members is rented to non-members at a flat rate per 100 lbs. of products stored per week, and the revenue is used to help pay operating expenses.

The advantages of these cold-storage facilities to the community are, it is estimated, such that the savings on local consumption of meat alone will make the cooler pay for itself in 15 months. This estimate was based on the comparison between the prices paid by packing companies for dressed meat and the retail prices that would be asked for the same.

Power costs for the first three months were respectively, $5, $4.14, and $3.92, and from these figures it seems unlikely that electricity will cost in excess of $60 per year. Expenditures for maintenance and repairs were estimated at $25 per year, though none were necessary during the three-month period.

Hogs which reach the most economical weight for slaughter during July, August, or September, can now be killed in spite of hot weather and stored or cured in the cooler. Several months of unprofitable feeding while waiting for cold weather can thus be eliminated.

In one case $50 worth of meat was saved by a non-member for less than $1 in storage charges, it is reported. A large hog fell and broke its leg, making immediate slaughter necessary.

The day was warm and the meat would probably have been lost except for the new cooler equipment.

The following is another circumstance in which savings have been effected:

One member had a small calf which would have brought about $4 at the stock yards. For butchering the animal he paid a man 5 lbs. of the meat, then he kept another 5 lbs. for himself. Put in the cooler for selling, the balance brought $9.10.

If 25 cents, which would be collected from a non-member for one week's storage, and the $4 value of the animal on foot were to be subtracted from the sales price of the meat, the net cash gain would be $4.85.

By adding $1 for the 5 lbs. of meat used by the farmer, the total net gain on the $4 calf becomes $5.85.

The walk-in box used by this community is 6 ft. 5 inches deep, 4 ft. 4 inches wide, and 8 ft. 6 inches high on the inside, while the net storage space is of the same depth, 4 ft. 4 inches wide, and 6 ft. in height. It is constructed of wood and insulated with 3-inch corkboard.

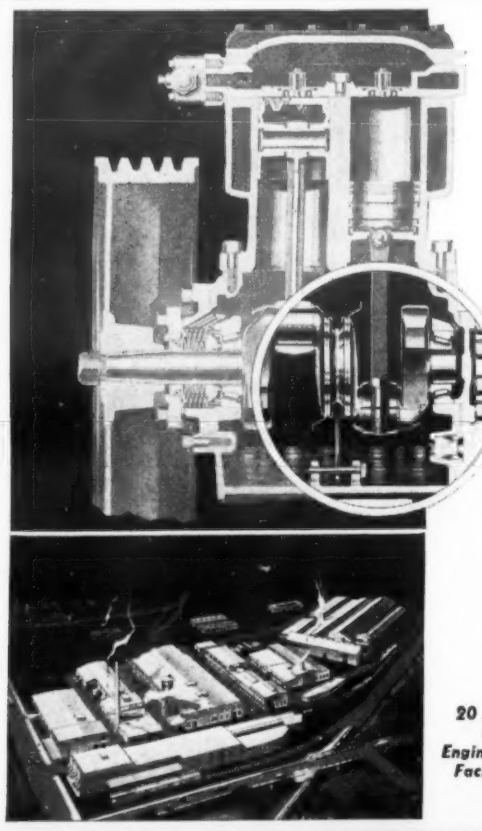
Refrigerating equipment consists of a ¾-hp. motor-driven air-cooled condensing unit, a finned coil evaporator, and a thermostatic expansion valve. The evaporator is located in the insulated bunker over the storage space, and the equipment is designed to maintain a temperature of from 34° to 36° F. in the cooler.

Georgia Power Reports $21,660 Sales in First 2 Months

ATLANTA — Although no air-conditioning business was reported, commercial salesmen for Georgia Power Co. sold more than $21,660 worth of refrigeration, water cooling, and water heating equipment during the first two months of 1937, reports to utility headquarters here reveal.

Commercial refrigeration sales head the list, totaling $17,199 for the two months period, with water coolers and water heaters running close on each other's heels with sales of $2,265 and $2,198, respectively.

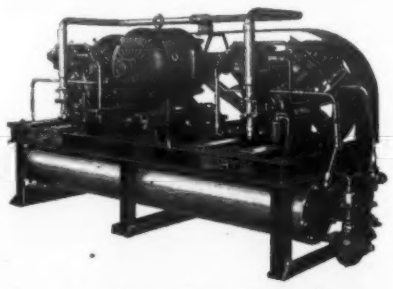
Total commercial business, including sales of cooking and heating equipment, water pumps, and miscellaneous eqiupment, was in excess of $37,000 for the period.



20 Acres of Engineering Facilities

Only CURTIS HAS CENTRO-RING

POSITIVE PRESSURE LUBRICATION



Only one moving part in the Curtis "Centro-Ring" oiling system—no gears—no plungers.

Other high-efficiency features include—Timken tapered roller bearings, V-type radial compressor, water-jacketed heads and cylinders, built-in oil separator with automatic return, drop-forged, heat-treated crankshaft and rods, balanced syphon bellows seal, and automatic water valves.

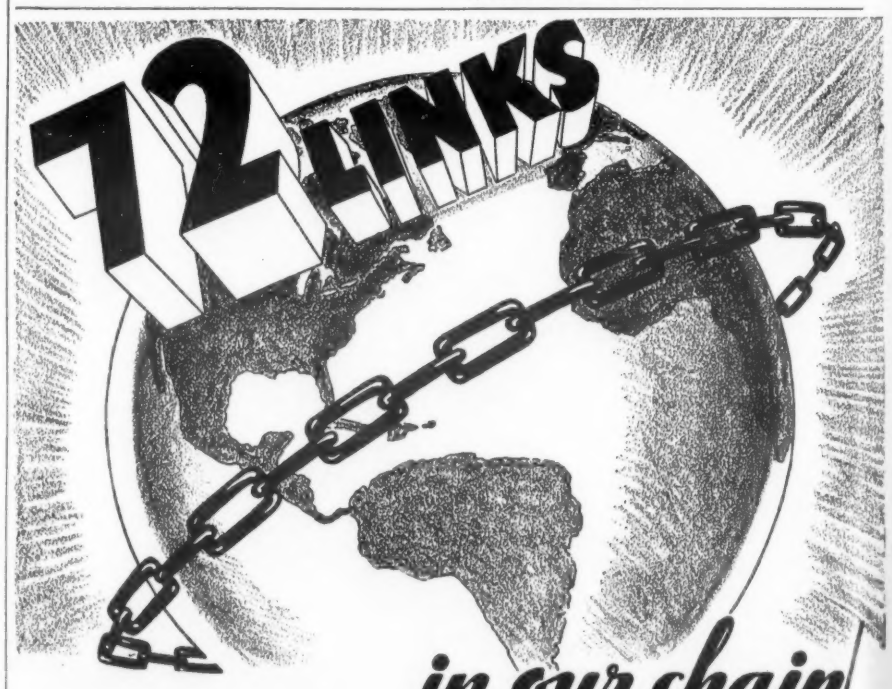
Forty-one Curtis air-cooled units ranging in size from 1/6 H. P. to 5 H. P., inclusive, and 45 water-cooled units of from 1/3 H. P. to 30 H. P., comprise the line. There's a model for every refrigeration or air conditioning requirement.

Curtis condensing units are the development of 82 years in engineering of which 15 years have been devoted to refrigeration.

Represented in Canada by
Canadian Curtis Refrigeration Co., Ltd.
20 George St., Hamilton, Ont., Can.

CURTIS

CURTIS REFRIGERATING MACHINE CO.
"Builders of Condensing Units Since 1922"
1912 KIENLEN AVE. ST. LOUIS, U. S. A.



in our chain OF DISTRIBUTORS!

The far-flung chain of Virginia distributors assures our customers of "plus" service. So often speedy delivery is as important as the refrigerants themselves . . . accounting for the popularity and world-wide acceptance of ESOTOO and V-METH-L. These excellent refrigerants are pure, clean, and **absolutely dry** . . . the answer to the desire of Refrigerator Manufacturers and Service Engineers for refrigerants that really "deliver the goods!" The coupon will bring you interesting information on problems that may confront you.

Virginia Smelting Company, West Norfolk, Virginia
I am interested in receiving free literature on electrical refrigeration.
Name .....
Address .....
City or Town..... State.....

VIRGINIA SMELTING CO.
WEST NORFOLK, VIRGINIA

-COMMERCIAL REFRIGERATION-

Fedders Introduces New Unit Coolers

BUFFALO—A new series of unit coolers applicable both to product and comfort cooling has been introduced by Fedders Mfg. Co. here.

The unit coolers are constructed with copper tube refrigerating coils, with copper fins arranged vertically. The cooling element is manifolded.

Blower equipment consists of a direct-driven 4-blade fan.

Cabinets are made of rust-proof material. Integral channel members at the front and rear of the cabinets provide ruggedness and rigidity to support the cooling element. Top of the unit is equipped with hanger brackets drilled with 9/16-inch diameter holes providing four-point ceiling suspension.

Bottom of the cabinet is insulated to eliminate accumulation of condensate on the outside of the cabinet.

New Low-Pressure Line Designed by Carbondale

HARRISON, N. J.—Designed for use with either Freon or methyl chloride as the refrigerant, a new line of self-contained low-pressure refrigerating units has been announced by Carbondale Division of Worthington Pump & Machinery Corp.

Compressor unit is compact, mounted to a welded steel base, and is said to require small floor space as well as low head room. Both suction and discharge valves are lightweight, quick-acting, weather type. V-type compressors, ranging in size from four to eight cylinders, are of special metal. Bearings and eccentric rod are bronze.

Electric motor drive to the compressor is of the multi-type. A self-adjusting motor bedplate maintains proper belt tension at all times, except on the eight-cylinder unit, which has adjusting screws for the motor baseplate.

Motor starter and high-pressure cutout are interlocked for safe operation. Starting is accomplished by means of pressure or temperature changes, with the usual automatic starting features.

Receiver is integral with a shell-type condenser, which is fitted with copper-finned condensing tubing and is of welded construction throughout.

Taylor Freezer Takes Over Another Building

BELOIT, Wis. — Taylor Freezer Corp., manufacturer of counter-type ice cream freezers, has taken over another building for manufacturing and storage purposes, according to Charles Shaw, advertising and promotion manager.

Burge Installs Two 10-Ton Baker Units In Cheese Plant

DETROIT—Two 10-ton Baker commercial refrigerating units are installed in the recently constructed Kraft-Phenix cheese storage plant, 3547 McKinley Ave. here by the local branch of Burge Ice Machinery Co., according to J. I. Coan, manager of the Burge branch.

Used with the installations are eight blower units serving the seven cooling rooms in the establishment, two of the diffusers serving one room alone. Of the seven storerooms, two measure approximately 80 ft. x 65 ft., and the others are about half that size.

Temperatures ranging from 36° to 38° F. are maintained by the refrigerating equipment. All the rooms are insulated with four inches of corkboard.

Burge Ice also has installed a 10-ton milk cooler in the Grass Lake, Mich., cooling station of Daily Creamery Co., whose main office is in Hamtramck. The Grass Lake plant is used for precooling, farmers bringing their milk there before it is shipped into the city to be pasteurized and bottled.

Another recent Burge installation consists of three 8-ton units placed in the two ice cream hardening rooms and the mixing room of the Dairy Lee Ice Cream Co.'s new plant. Each of the hardening rooms has a capacity of 5,000 gallons.

York Introduces New Oil Chiller

YORK, Pa.—York Ice Machinery Corp. has introduced a new and improved type shell-and-tube oil chiller to be used with its booster and stage compressor, and ammonia liquid circulating system.

Features claimed for this equipment are:

Elimination of solvent loss through glands because solvent is prevented from coming in contact with glands by oil pressure within the oil-filled gear space.

Reduction in number of packing glands necessary to one gland per 146 sq. ft. of chilling surface.

High heat transfer due to constant positive circulation of solvent and oil through tubes, and to constant removal of wax from all cooling surfaces by specially designed, knife-edged mechanical scrapers.

Small space occupied, equal to about 65% of space occupied by present design.

An eight-shell unit of this type is 23½ ft. x 5 ft. x 10 ft. when insulated, and contains 1,170 square feet of effective chilling surface.

Proper Refrigeration Plays Important Part In New Atlanta Winery

ATLANTA—Installation of proper refrigeration equipment played an important part in construction of the recently completed 1,000,000-gallon-per-year winery of Garrett & Co.

Before it enters the large oaken vats in the new winery's storage room, wine is precooled in a direct-expansion double-pipe cooler having stainless steel tubes. The storage room itself is kept at uniform temperature by coils suspended from the ceiling.

A 5 x 5 Frick ammonia compressor handles both precooling and storage work. The cooler has six pipes 2 and 3 inches in size, and is 20 feet long. The room itself measures 50 x 20 x 15 feet. Keeping the wine at low temperature during storage greatly improves its character and brings out the bouquet.

Refrigerating equipment for the winery installation was sold by Hallam Engineering & Construction Co., and was installed by Davidson-Kennedy Co. of Atlanta, both of whom are Frick distributors.

Control of fermentation is equally as important as control of temperature, so before being bottled the wine is passed through germ-proof filters. A special type of paper is used in these filters, for one live germ in a bottle would start to "work" with the sugar, and would change the wine. Wine is not pasteurized as this process tends to have an injurious effect.

Alcoholic content of these wines is between 12 and 14% by volume. Besides grapes, such fruits as blackberries, peaches and apples are used. Garrett & Co. has been making wines for 101 years, and lists among its American wines Bergundy, Catawba, Claret, Rhine, and Chablis, in addition to Haute Sauterne, Paul Garrett Dry Wine, Riesling, Georgia Crackerjack, Virginia Dare, and many others.

THE Hill REACH-IN REFRIGERATOR

Made Especially for HOT KITCHENS

Here is a box with heavier insulation, to keep down operating costs; all-porcelain exterior and interior, to withstand hard usage; better refrigeration, to prevent spoiling and drying; and many other features.

• Send for complete illustrated 32-page catalog using business letterhead.

Note thick center of low conductivity corkboard insulation and also insulating board covering entire exterior, including frame.
THE Hill
TRENTON, N.J.

HILL PRODUCTS DIVISION
C. V. HILL & CO., INC., TRENTON, N. J.

SUCTION AND DISCHARGE VALVES ARE ASSEMBLED IN A COMPLETE VALVE PLATE UNIT FOR SIMPLIFIED REPLACEMENT

It rarely happens on a Brunner . . . but when the valves do "act up", the trouble can be corrected inside of a few minutes time. Yes, and you don't have to search for an expert — any mechanic can do it! The complete assembly of Brunner suction and discharge valves in a single valve plate means that by removing a few bolts, lifting out the faulty valve plate and installing a new one, the job is quickly finished without loss of service, without loss of refrigerant . . . The unique valve plate assembly exemplifies the advanced thinking behind every Brunner detail. Why not get better acquainted with the way Brunner Refrigerating Equipment is engineered for dependable service? * * Forty-seven condensing units and five compressor models for nearly all refrigerating and air conditioning requirements.

BRUNNER MANUFACTURING COMPANY, UTICA, N. Y., U. S. A.

BRUNNER

BUILDS FOR *Greater* DEPENDABILITY

AROUND THE WORLD WITH GEORGE F. TAUBENECK

Germany, land of a desperately regimented populace, is also the home of high technical development, scientific progress, and advanced industrial processes.

Stopping for two weeks in Berlin near the close of his 'round-the-world journey in search of information on refrigeration and air conditioning in foreign lands, Editor Taubeneck found such oddities as an off-peak refrigerator, and a combination electric and coal range.

After winding up his story on Sweden, he tells you about some of his German findings in this installment.

Sane Work Relief

Sweden operates on the theory that all able-bodied males must work. There is no statutory relief system as we know it— only the Poor Law, which takes care of indigent and helpless women and children. But the country is convinced of the value of work relief, and has had a system organized under the National Unemployment Commission since 1914. This was set up when compulsory unemployment insurance efforts failed.

Swedish authorities plan projects for reserve works which, under normal conditions, need not be begun for three years. None of this hasty, spend-the-money-for-votes planning for them.

Thus, by painstaking and well-nigh flawless planning, the government knows exactly how many men it will need for, let us say, the new Malmo viaduct in 1940—and division of labor is carefully apportioned in regard to costs of materials, how many men will be needed for various tasks, how much slack can be taken up during a low period industrially, etc.

And every project must have demonstrable economic or cultural value, even though the laws provide that the major portion of expenditure on these reserve works should go to the labor employed on them.

Like the WPA, the Swedish reserve projects system is designed to take care of the unemployed when private industry cannot. But there is a fundamental difference: the Swedish projects are ready to start *before* unemployment arises. They are held in reserve until needed.

If a public work is started, and business picks up in that particular industry, the reserve project is closed down. There is no chance of competition with private industry. Roads, bridges, buildings are left unfinished until the next depression comes along.

Thus there is no conflict between government and private labor in time of prosperity. Men are continually being shifted from one project to another as they are needed, with absorption of regular workers into their places as soon as possible. Several of these unfinished projects are noticeable in various parts of Sweden, particularly an unfinished trolley line outside of Stockholm.

If a worker has an offer of a private job in Sweden, he must take it. The public employment exchanges, operated under civil service with subsidiary commissions in each community, cooperate closely with the main commission.

Men's names are filed according to their skills, and as soon as a job comes up, they are notified. *If they refuse the job, they are automatically dropped from the rolls.* Sweden has no sympathy with America's problem of crops rotting because relief workers cannot be lured away from easier jobs elsewhere.

Swedish work relief commissions are rather hard-boiled about slackers. They remunerate on a scale determined by the lowest rate ordinarily paid to unskilled labor in any given locality. And they only hire men when all other efforts to employ them have been exhausted.

Men working on these reserve projects are paid on the basis of piecework. There is little shirking, lazying around, or retaining of the inefficient where there is no use for them. If a man works six hours on a three-hour job, he gets three hours' pay—not six.

Despite careful planning, the Swedish reserve system couldn't take care of the unprecedented unemployment conditions arising during 1932. The country was forced to resort to direct relief. This was alloted on the same basis as relief jobs, but was discontinued just as soon as the depression was over.

To avoid a similar future contingency, the Swedish government set up a special commission to study added possibilities for unemployment, covering a wider range of projects.

This commission is still working, surveying the needs of every city, town, and village in the nation. These needs will be presented to the next session of parliament, and a considerably expanded reserve works program is expected to be provided.

Public works are paid for by a sensible system. Although the last depression caused Sweden to borrow money to pay for public works and relief costs, she ceased emergency spending as soon as the depression ended, raised taxes, and through increased revenues and prevention of wildcat expenditures managed to pay off the last of the debt early in 1936.

Two sets of books were used during the borrowing period: one for budgetary expenses and the other for emergency projects financed by loans. When the depression stopped and revenues picked up, the emergency books were closed out, the debts paid, and the country returned to its pay-as-you-go system.

* * *

Exporting Industries

In addition to Electrolux, other important Swedish exporting industries have developed notable world markets. For instance:

The Trafik A. B. Grangesberg-Oxelosund owns and works mines, railways, and ships used in the production and transportation of iron ore. Besides these, it operates an explosives factory and several power stations.

Stora Kopparbergs Berslags A. B., founded in the 13th century, is an ancient industrial concern which has achieved international renown through the utilization of Swedish natural resources such as iron ore, forests, and water power.

A. B. Svenska Kullagerfabriken (known everywhere as SKF) is the largest manufacturer of ball and roller bearings in the world. This company controls the SKF company in the United States, and does 70-80% of the ball bearing business in other parts of the world.

A. B. Separator, amalgamated with A. B. Pumpseparator and A. B. Baltic, makes the "Alfa-Laval" milk separators and milking machines and "De Laval" industrial separators, both named after their inventor, Dr. Gustav de Laval. Most farm homes in America have them.

Telefonaktiebolaget L. M. Ericsson manufactures and supplies telephone materials of all kinds, exchanges for large and small communities or for private use, both automatic and manual, as well as complete long distance equipment. Hundreds of factory branches are maintained in European countries.

Another Swedish company with international ramifications is Svenska A. B. Gasaccumulator, makers of the "Aga" systems of illumination. This acetylene process, invented by Gustav Dalen, has been used in lighthouses, railways, crossings, traffic signals, air markers, gas welding, and metal cutting by an acetylene-oxygen flame.

In the Aga system, acetylene in the form of gas-in-solution is used. The gas is dissolved in acetone and compressed in containers, called "gas accumulators," filled with a porous substance.

Separate Aga companies or associated firms are operating in 40 countries.

Allmanna Svenska Elektriska Aktiebolagat (ASEA) started in 1883 to export Jonas Wenstrom's dynamos. It also makes ore separators, melting furnaces, locomotives, etc. It is now the largest electrical firm in northern Europe.

ASEA's motor works has a capacity of 60,000 generators and transformers per annum, ranging from a fraction to several thousand hp. The company also makes converters, mercury rectifiers for the highest powers and voltages used, electric furnaces, electric locomotives, transformer precision gears, geared motors, and electric hoisting and transportation apparatus.

Branch factories are maintained at London and Oslo. An extensive export trade is carried on with several European and Asiatic countries.

International activities of Electrolux were reported earlier in this series.

* * *

Ports and Liners

Of great value to the Swedish export trade are the country's numerous transoceanic lines, which connect with ports in the United States, England, Australia, South Africa, New Zealand, Argentina, Brazil, Central America, China, Japan, the Straits Settlements, British India, Mexico, Canada, Chile, and other ports in Europe, Asia, and the Orient.

Swedish sea captains and crews are almost as well known in maritime circles as are the British and Dutch, and Swedish boats carrying home-produced goods have reached practically every important port of call on the globe.

Gothenburg, Stockholm, and Malmo are the three largest ports in Sweden. Lulea and Oxelosund are much smaller, but are important shipping points for iron ore.

The largest of these ports, Gothenburg, is located on Sweden's west coast, and does a total inward and outward tonnage of 12 million gross tons annually. Stockholm, the capital, is on the east coast, and does nine million gross tons per year. Malmo is located on the extreme southern tip of the country, with an annual gross tonnage of more than seven million tons.

All three are free ports for the international transit trade. Other Swedish ports connected with various export and import shipments are: Tralleborg, Halsingborg, Gavle, Norrkoping, Sundsvall, Kalmar, Landskrona, Harnosand, Soderhamn, Vasteras, Karlstad, and Kristinehamn.

* * *

Church of Sweden

In learning about the Church of Sweden, I noted three remarkable aspects: (1) the age of the Church; (2) its harmonious cooperation with the government; and (3) the electoral system by which the higher officials are chosen.

Though the Church of Sweden is by far the most dominant religious body in the country, there are other groups. The Methodists number about 15,000, and comprise a community. There are also about 3,500 Roman Catholics, and twice as many Jews. These three faiths are accorded complete tolerance, and allowed to function independently.

The Missionsforbundet, or Swedish Mission Association, though still part of the Church, openly objects to the latter's relationship with the State. This organization, whose members number about 114,000, is a Congregational sect. With about half that many members, the Baptist sect also disapproves of certain activities and positions of the Church, but remains within the fold of the Church of Sweden.

The latest division to be formed is the Pentecost Movement, in which there are some 20,000 worshippers who find fault with the Church, but evidently do not wish to break away from it.

At present there is developing within the Church a system of voluntary services for the promotion of various forms of public welfare work. Included in this category is the Young People's Movement; schools for deaconesses, parish sisters, and deacons; and other such activities, all centrally supervised by the Diaconate Board of elected clergy and laymen, with the Archbishop as chairman.

The Church of Sweden is active beyond the borders of the country, having communities in London, Paris, Berlin, Buenos Aires, Melbourne, Oslo, Helsingfors, Copenhagen, and elsewhere. Smaller establishments of the Church are caring for sailors in large ports the world over.

The Church also does missionary work in non-Christian countries.

Second largest Swedish religious community outside of the mother country is that of the Augustana Synod in North America, which has about 300,000 members and twice as many followers.

* * *

Educational System

Sweden's educational system is under the control of the Ministry of Public Worship and Education.

Children's elementary and secondary education is supervised by the Board of Education, a body responsible to the Ministry. This Board has four divisions, one for elementary schools, one for public and private secondary schools, one for trade schools, and a fourth which is a statistical department.

The three departments pertaining directly to schools are each supervised by a departmental chief. The Board itself is composed of a Director-General, 14 appointed members, the head of the Statistical Department, and certain other officials of the system.

Elementary schools in local areas generally are controlled either by school councils appointed by the parish assembly, or by the church trustees. County government authorities and the Chapter, or ecclesiastical body of the diocese, share authority over the financial affairs of the local schools.

Usual elementary school course runs for six years, the first two being spent in an Infant School. The pupil begins elementary school in his seventh year, and should finish in his 14th.

The school year is at least eight months long, and in many places nine, or even more, months of attendance are required.

Subjects taught in Swedish elementary schools are much the same as those included in the average American curriculum, substituting the Swedish language, adding a patriotic class known as Local Conditions and Topography, and making religious knowledge a required rather than an elective subject.

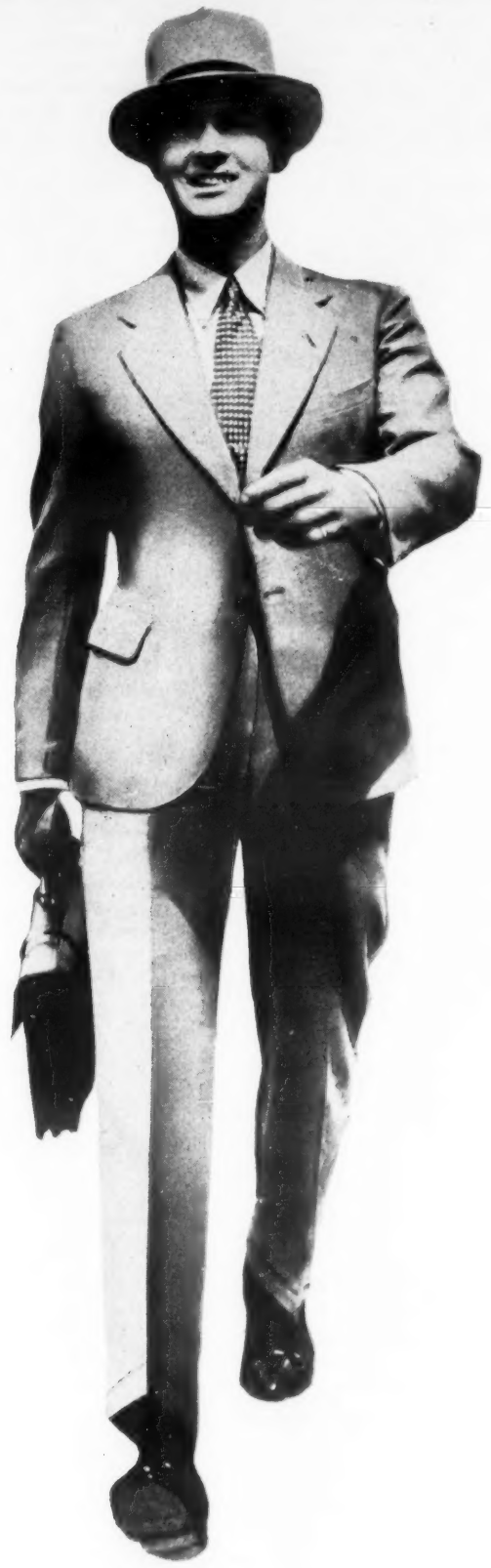
Teachers receive their training at the State Training Colleges for Elementary School Teachers, each of the colleges having a practice school attached. Over two-thirds of Sweden's elementary school teachers are women, and all of them are appointed to their positions by the parish.

Their salaries are financed cooperatively by the State and the parish on a 90%-10% basis. The State further

(Concluded on Page 10, Column 1)

Flower Markets Well Patronized in Newly Prosperous Berlin

Rearmament has brought renewed prosperity to Berlin, and once again the flower markets (pictured above) are well patronized and lively. Women shoppers buy flowers along with groceries.



To the man on the street

AIR CONDITIONING

Means

COMFORT COOLING

TO most folks, "air conditioning" means summer cooling. It means cooling and dehumidifying to result in a feeling of comfort in hot weather. Theaters were among the first to introduce "air conditioning" to the public on a wide scale. By affording a cool, comfortable atmosphere in which patrons could enjoy the show, theater attendance was greatly increased during summer months. Millions of people gained their first impression of "air conditioning" in the theater.

Restaurants soon found it profitable to "air condition" their rooms during the summer season. The installation of "air conditioning" in retail stores, beauty parlors, and office buildings has further contributed to the general expansion of the public's impression that "air conditioning" is built upon the cooling function.

There is nothing dramatic in heating a building for the purpose of health and comfort in cold weather. This has been done since men first learned how to build a fire. But to cool a building for comfort in hot weather was a new thought that quickly seized public imagination and approval.

As a subject for conversation, "air conditioning" is freely talked about today. It is being widely publicized. People may have various ideas regarding its functions but to the great majority it means summer comfort.

To the man on the street, "air conditioning" means cooling, and it isn't "air conditioning" if it doesn't include cooling.

The cooling feature in air conditioning was developed, of course, and is produced by the refrigeration industry, and the experienced refrigeration dealer is the natural source of supply for this all-important function of cooling and dehumidifying. Refrigeration distributors and dealers are the natural outlets for "air-conditioning" equipment. They read AIR CONDITIONING AND REFRIGERATION NEWS each week as it brings them the news and developments and changes within the industry.

AIR CONDITIONING AND REFRIGERATION NEWS
5229 CASS AVE., DETROIT, MICHIGAN

Representatives: John B. Gallagher Co., Incorporated, 11 West 42nd Street, New York, New York . . . . . Lewis & Noelle, 612 North Michigan, Chicago, Illinois

(*Concluded from Page 8, Column 5*)

supplies regular, timed pay raises, while the parish provides free housing and fuel, or cash as a substitute. Pensions are supplemented by the State.

The student who is graduated from the elementary school and who does not intend to enter high school must attend a continuation school, so that he may be trained for some specific trade.

When he becomes 18 years old, the Swedish young man may enter a People's High School to obtain general and civic education. Most such institutions are boarding-schools located out in the countryside.

The State helps to support these collegiate schools, and grants competitive scholarships. Teachers are, for the most part, university graduates, trained engineers, or agriculturalists.

Higher education is provided in the State Secondary Schools, which come in three classifications: Independent Lower Schools, Higher Secondary Schools (both Lower and Upper School), and Lyceums. Most of them are co-educational, although a few are specifically designated for one sex alone.

The Upper School prepares students for the university, and for advanced professional training.

The normal school year in Sweden corresponds to the American scholastic calendar. The year begins in the first week of September, and ends in June. Summer holidays cover an 11-weeks period; Christmas vacation lasts three weeks. Other regular holidays are Easter (seven days), and Whitsuntide (four days). Scattered through the rest of the term are a maximum of 18 other holidays, most of them for one day or a half-day. These are devoted largely to outdoor exercise and games organized by the schools.

The school day itself is sensibly arranged. Classes last for not more than three-quarters of an hour, and at least 10 minutes must elapse before the next class begins. A rest period of at least an hour and a quarter must be observed at some time during the day, and no student may enroll in more than seven classes per day.

An important role in Sweden's educational system is played by stiff, all-embracing examinations. Not only must a student pass an examination to advance from one grade to the next, but he must make a satisfactory showing in another examination before he may leave elementary school, in yet another to enter secondary school, in still another to leave it.

Students (except those provedly without means) are required to pay various annual fees into the school funds and to the State. For these fees they receive in addition to their education, the chance to win scholarships and prizes for good progress.

Pupils attending a continuation school may enroll in one of the workshop schools to get practical training in a specified trade. For youths between the ages of 15 and 21, there are apprentice schools, where handicrafts, industrial, commercial, and domestic work are taught.

More specialized training is available at the higher trade schools, attendance at which is voluntary.

Higher commercial schools are supported by the State and the municipalities, with small added fees from the students, and there are various other professional training shools, such as schools of navigation, agricultural schools, and forestry schools.

The University of Technology in Stockholm, and the Chalmers' Institute in Gothenburg, are headquarters for advanced technical education. Here the students pay high annual fees.

There are two State universities in Sweden, that of Uppsala, established 1477, and that of Lund, established 1668. Colleges of Law, Medicine, Theology, and Philosophy belong to each. Two private universities are located at Stockholm and Gothenburg. The university at Stockholm has a college of mathematics and natural science, a college of law and political science, and a section for study of the Humanities (called social sciences in America).

Supervised by a Chancellor for the Universities of the Kingdom, the State medical school at Stockholm is designated as the Caroline Medico-Surgical Institute. The supervising official is appointed by the king on the advice of the university faculties.

A notable fact about the universities is that instruction is free. Foreign students are welcome, but must meet special regulations and conditions. Some of the rules for the foreign matriculants:

They must pass an examination comparable to the Swedish matriculation test, they must offer acceptable evidence that they have attended a foreign state university, and they must obtain the permission of the Academic Consistory.

Adult education is fostered currently by the building of libraries, by popular scientific lecture series, by radio broadcasts of educational programs, by private study circles, and by vacation courses at the universities. Such forms of educational work are State subsidized.

* * *

Germany

Matter-of-Fact

Personalities are submerged in German electrical, refrigeration, and appliance organizations. About their machines—yes, they'll tell you. And with much pride. About their people, their sales executives, their designing engineers? Well, no; you wouldn't be interested, they say.

Practically no American electrical appliances come into Germany, of course. Tariff and import restrictions in Germany are practically equivalent to prohibition. So Frigidaire has its own factory in Berlin—which I visited—and gets a lot of the business, as Frigidaire does everywhere.

Other leading refrigeration firms are AEG (which has a working agreement on designs and patents with the General Electric Co. of the good old U.S.A.), DKW, Bosch (which puts out a cylindrical cabinet and a machine which operates on an off-peak-load cycle), and Electrolux, which also has a factory in Berlin. AEG is so gigantic and so important that you shall hear about it in detail—now.

* * *

Giant Aeg

Universal Electrical Co., known throughout the world under the designation AEG, was founded April 19, 1883, by Emil Rathenau as the "German Edison-Company for Applied Electricity" with an initial capital of 5,000,000 marks. Its original purpose was to commercialize the lighting system invented by Edison by furnishing incandescent lamps and erecting power stations for the production of electric current.

This basis of the undertaking soon proved too circumscribed, especially the stipulated conditions which had to be entered into for the acquisition of the licenses. In the long run they proved to be an unbearable restraint upon the young enterprise. Hence the agreements were placed upon a new basis which enabled the free development of the company. As an external expression of the newly founded relations the name of the company was changed on March 23, 1887, to the "Universal Electric Co."

The patents, for which the company up to that time had possessed a general license, passed into possession of the new enterprise. Stock capital was increased to 12,000,000 marks. At the same time the Wedding Machine Factory was acquired, together with the land belonging to it, which was bounded by the Acker, Hermsdorfer, Feld, and Hussiten Streets.

At the beginning of 1888 the production of dynamo-machines and motors was begun by AEG. Broader fields of production were added, and new factories for the production of electrical products were erected. More central power stations in Berlin, in the nation, and in foreign countries followed the first power stations, which had been erected for the capital city alone.

* * *

Electric Railways

Next field to be exploited was electric railways, for which the AEG made use of her acquired German Local and Street Car Joint Stock Co. In the field of transmission of current a great step forward was taken in the year 1890 by the new rotary current system, developed by the AEG engineer, von Dolivo-Dobrowolsky.

This system was initiated at the Frankfurt Electrical Exhibition in 1891 with the transmission of water power current from the 175-kilometer-distant power house of Lauffen on the Neckar, to Frankfurt on the Main.

The best picture of the company's rate of development is given by the increases in capital, whose rate and tempo manifested themselves in equal measure in the expansion of the ground work business (power works, railways, industry works) as well as in the enlargement of the production factories, especially in the erection of the large factories in Brunnen Street, the cableworks at Oberspree, turbine factories, transformer factories in Oberschoneweide, and of the factories in Henningsdorf.

In 1890 the capital stock of the company, founded seven years previously upon 5,000,000 M, amounted to 20,000,000 M; in 1900 it was 60,000,000 M, and in 1914 at the outbreak of the war 115,000,000 M. At the conclusion of the inflation period following the war the capital stock had, after the change in gold valuation, the same worth with 156,259 million M as it had before the war. In 1927 and 1929 further increases brought the capital stock to 200,000,000 marks.

* * *

Several Factories

During the recent period of expansion has come the erection of a large factory in Treptow, as well as large additions to the Brunnenstrasse (Brunnen Street) factories, to the Oberspree Cable Works, and to the transformer factory in Oberschoneweide.

The groundwork area, which belongs to the company, covers a total of 4,000,000 square meters; the number of employes working in AEG concerns numbers more than 80,000.

Factories maintained by the AEG include:

1. The Treptow factory, which makes control apparatus, mercury vapor tube adjusters, measuring instruments, cinematic film projectors, relays, Telefunken apparatus, and radio parts.

2. The Brunnenstrasse works, which builds railroad materials, lifting machinery, large-scale machinery, fractional-horsepower motors, and air dusters.

3. The Hennigsdorf works, which fabricates electric and steam locomotives, special instruments, tramways, powdered carbon combustion engines, industrial furnaces, tanks and accessories; products in Novotexte, Micanite, Tenacite and porcelain; insulating lacquers, silk and fabric insulation, insulating tubes; welding machines, stamping machines, nuts and bolts, mechanical and electrical signals for railroads.

4. The Oberspree cable works, manufacturing live and insulated wire and cable, enameled wire, rails, sheet-irons, tubes, metal ribbon, stamped and impressed pieces, material for aerial and railroad lines, casting aluminum, brass and bronze, copper, Silumine, Electrone, white metal, tapping metal, ebonite products, Stabilite and rubber asbestos, insulating paper tubes sheathed in lead or brass, trim, running cables and their accessories, Pupin spools, amplifiers, and cable drums.

5. The porcelain works at Henningsdorf, which concentrates on electro-technical porcelains.

6. The transformer plant, which makes transformers and high-tension equipment.

7. The turbine factory, which builds steam turbines, auxiliary motors, pumps, compressors, air ventilators, turbo-generators, heavy oil machines, and turbo-dynamos for locomotive illumination.

8. The Ackerstrasse works, which consists of comptometer factory.

* * *

Not Bernard Shaw

Much as he may look like George Bernard Shaw, the old newsseller pictured above is typically Teuton.

Santo Refrigerators

Today, AEG manufactures a wide range of electrical household appliances, including refrigerators, cookers, heating equipment, ranges, and toasters. AEG's leading appliance is its "Santo" refrigerator.

Standard "Santos" range in cabinet size from 0.12 cubic meters, approximately 4.24 cu. ft., to 0.62 cubic meters, or approximately 21.9 cu. ft. They are completely automatic, the entire mechanical unit being installed in the top of the lidded box, while the freezer itself is mounted in the upper right-hand corner of the cabinet.

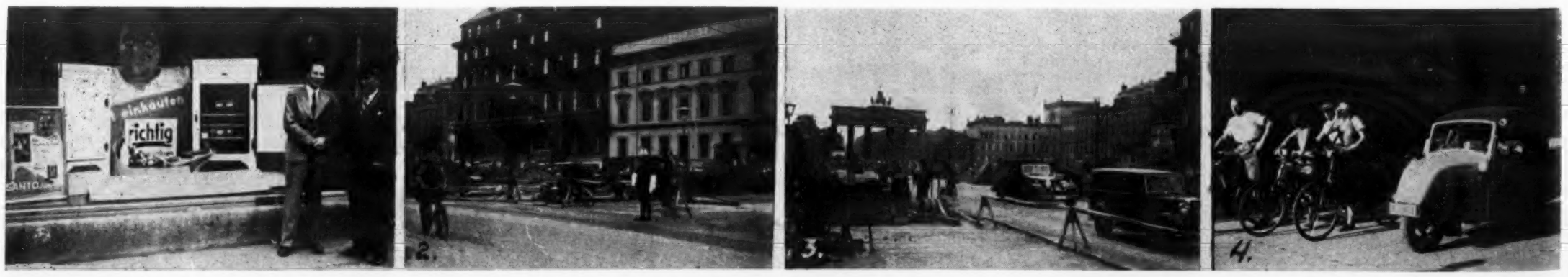
Under normal conditions, the temperature is maintained at about 6° C., or 42.8° F., although naturally the freezing compartment is much colder.

Two of the smaller refrigerators constitute the "Santo Junior" line, their cooling capacities being 130 liters, or about 4.6 cu. ft., in the "Grosse 1" box and 205 liters, or approximately 7.24 cu. ft., in the "Grosse 2."

Both "Juniors" have freezing capacities of 2 kilograms (approximately 4.4 lbs.) of ice, the maximum number of cubes being 52. Their cabinets are of similar construction, consisting of two fitted frames of sheet steel separated by a thick layer of insulating material. The outer frame has a finish of a manifold coating of white enamel; three coats are applied to the inner case.

Though the corners and edges of the cabinet are rounded, they are not curved, and the general appearance of the refrigerator is one of old-fashioned squareness. This impression of out-modedness is made firmer by the fit-over lid, the square, protruding hinges, and the high, spindle legs.

Progress of Berlin's Modernization Program Removes Linden Trees from 'Unter der Linden'



(1) Fat-cheeked Freda, the Santo (G-E refrigerator) girl, is the best-known figure in German appliance advertising. (2 & 3) Widening of "Unter der Linden," Berlin's most famous thoroughfare, necessitated the removal of its famous trees. (4) Gaso line being expensive, the Germans use plenty of bicycles and motorbikes, as well as motorcycle-trucks, like the one above.

— DEPARTMENT STORE NEWS —

Thomas, Strawbridge & Clothier Manager, Feels that Manufacturer Must Aid Dept. Stores to Solve Trade-In Problem

By T. T. Quinn

PHILADELPHIA — If department stores are to realize the possibilities in the refrigerator replacement business, they're going to need assistance from the manufacturer in the form of allowances for trade-in units, in the opinion of C. W. Thomas, manager of the major appliance department of Strawbridge & Clothier.

"Replacement business is beginning to be a factor," Mr. Thomas said, "and most department stores are at a loss as to what to do about it. Under our present policy, we won't touch trade-ins on either electric refrigerators or washers.

"The manufacturer might do several things to help. He might give the department store an allowance for trade-ins, or sponsor an arrangement whereby the used refrigerator might be taken over by him, either for repair or, if it is in bad condition, for junking.

"If he isn't inclined to assume the full burden of trade-ins, the manufacturer might at least agree to assume a fourth of the cost of the used unit, the other three fourths to be split among the distributor, the department store, and the salesman.

CAN'T HANDLE TRADE-INS

"The way things are at present, department stores can't handle trade-in business—it costs too much. Besides, the department store has a reputation to maintain for quality merchandise, and having a bunch of used refrigerators on display won't help this reputation any."

Strawbridge & Clothier's appliance department is on the fifth floor, but attention of prospects is called to refrigeration by a spot display in the store's main arcade. Frigidaire held the floor the week I was there, but Mr. Thomas told me that the display is changed weekly, rotating among Frigidaire, AMC, Kelvinator, General Electric, Westinghouse, Crosley, Electrolux, and Top-Icer ice refrigerators.

A huge Frigidaire display was set up fronting the fifth floor elevator exits, in preparation for the store's mid-March refrigeration show, Mr. Thomas said. Just around the corner from the elevators is the department proper, with each make of refrigerator in a wall niche all to itself, the center of the floor being filled with washer displays.

BUSINESS BETTER

Business has been better than usual this year, Mr. Thomas said. In fact, the store will show a 20% increase for the year, on the basis of February sales.

Thirty salesmen are working the department, spending their time evenly working inside and out of the store. Most leads, Mr. Thomas says, are the result of floor traffic, although his men aren't above going right out on the cold canvass every now and then. Helping draw crowds to the department is a series of tri-weekly newspaper ads during March, April, and May, in addition to the regular spring showing.

A series of window displays is also run during the spring and early summer, and has proved a worthwhile traffic attractor, Mr. Thomas says.

What kind of men make the best refrigerator salesmen? Mr. Thomas thinks it's hard to say. There's no pat yardstick, he's found.

"Green men, willing to learn, make better producers for us than some experienced man who's all set in his selling ways and won't listen to our advice," he declared. "Some old-timers have an idea that floor leads are the bunk—others are 'down' on canvassing—some others are lone wolves, with a 'system' all their own. Men like this are hard to manage, and we feel that a store of our kind is, in most cases, better off without them.

"Give me an inexperienced man, willing to work and willing to use all the methods we have for getting business—canvassing, callbacks on users, calls on new owners, and floor leads—and we think he'll make a good living with us, working on commission only."

SERVICE BY DISTRIBUTORS

Servicing on refrigerators sold by the department store is handled through the various distributors; delivery, as well, is handled in this manner. For a lump unit sum, the distributor takes over the whole problem—an advantage for the customer, in Mr. Thomas' opinion, because the job is in the hands of the person most interested in seeing that it gives complete satisfaction at all times.

With delivery also being made by distributors, Strawbridge & Clothier confines its activities to stocking a complete line of models, and using them for display purposes only.

Sales Manager or Distributor for Washington, D. C.

Due to absorption of Washington's oldest, largest electrical house by national manufacturer and discontinuance direct sales activities, manager seeks new connection for Washington sales. His special qualification is abilify to organize specialty sales on profitable basis and to secure large volume business. In 14 years as manager has made profit each year; total sales about $11,500,000; sales past two years over a million each year on varied line including electric refrigeration both domestic and commercial, ranges, air conditioning and oil heating. Commission or equivalent basis preferred. Will consider good distributorship. Age 39. Graduate engineer. Address C. L. McCrea, 3300 Cathedral Ave., Washington, D. C.

Employe Tips, Rotation of Prospects, & Tie-in with Utility Cooking Schools Put Lugg Among Leaders

By T. T. Quinn

SCRANTON, Pa.—Non-selling employe activities, tie-ins with utility cooking schools, and rotating prospects among salesmen unless they're followed up consistently are three of the principal methods back of Herbert Lugg's success with a Westinghouse resale operation in the Globe department store here.

The department store outlet, however, is only one of four operated by the W. H. Lugg Co., Duryea, Pa., department store. Others are in Old Forge and Pittston.

Mr. Lugg took over the Globe store's appliance department in April of last year. By arrangement, the store gets a 10% override on sales, and six of the store's men sell the complete line of major appliances. Altogether, there are about 20 men in the department, all of them except S. A. Dearborne, the manager, working on commission only.

The men work both inside and outside the store, Mr. Lugg says, obtaining leads through canvassing and floor leads, user tips, and friends. His best salesmen, however, are the ones most devoted to canvassing, he declares.

Daily reports are required on calls made, and the men are protected in leads they originate. Leads are rechecked regularly, to make sure they're being followed; and if the salesman has gone stale on the job, another one gets his chance.

A good source of prospects, and business, has been leads turned in by employes of other store departments, Mr. Lugg says. Last Christmas the appliance department gave $50 in bonuses to employes who submitted the most leads resulting in sales.

At Easter, Mr. Lugg is planning to run another contest, but this time it'll be different—prizes will be awarded by draw, and every lead-sale will earn the employe a ticket, from which the winning numbers will be selected. The more sales, the more tickets. Mr. Lugg believes this will stimulate more activity, since every person will have a chance of sharing in the prizes.

Electric range sales in the Lugg territory have been good, principally because of cooperation from the utility company in the area, Scranton Electric Co. Under the utility's rental range plan, rates are as low as $1.87 per month, Mr. Lugg says, with as long as four years to pay and a finance charge of but 3%.

The power company has no rental ranges of its own, but buys them from territorial dealers at regular retail prices, allowing a trade-in of $15 on any old cooking apparatus the customer wants to turn in on the new equipment.

Mr. Lugg has sold 25% of all the ranges put on the lines in the Scranton Electric Co. territory, he says. He finds the cooking schools conducted by the utility company from time to time a prolific source of valuable leads.

Toledo's Lion Store Opens Suburban Sales Branch

EAST TOLEDO—A new branch known as East Side Electric Appliance Shop has been opened here by the Lion Store, Toledo department store.

The new branch, according to Earl Adams of the parent store, will handle the same appliance lines sold in the downtown store, including Frigidaire and General Electric Refrigerators, Philco, RCA-Victor, Sparton, Zenith, and Grunow radios; Maytag and Thor washers; Magic Chef, G-E, and Standard ranges.

The same credit service and purchase plans in use at the downtown store are also available at the East Side shop.

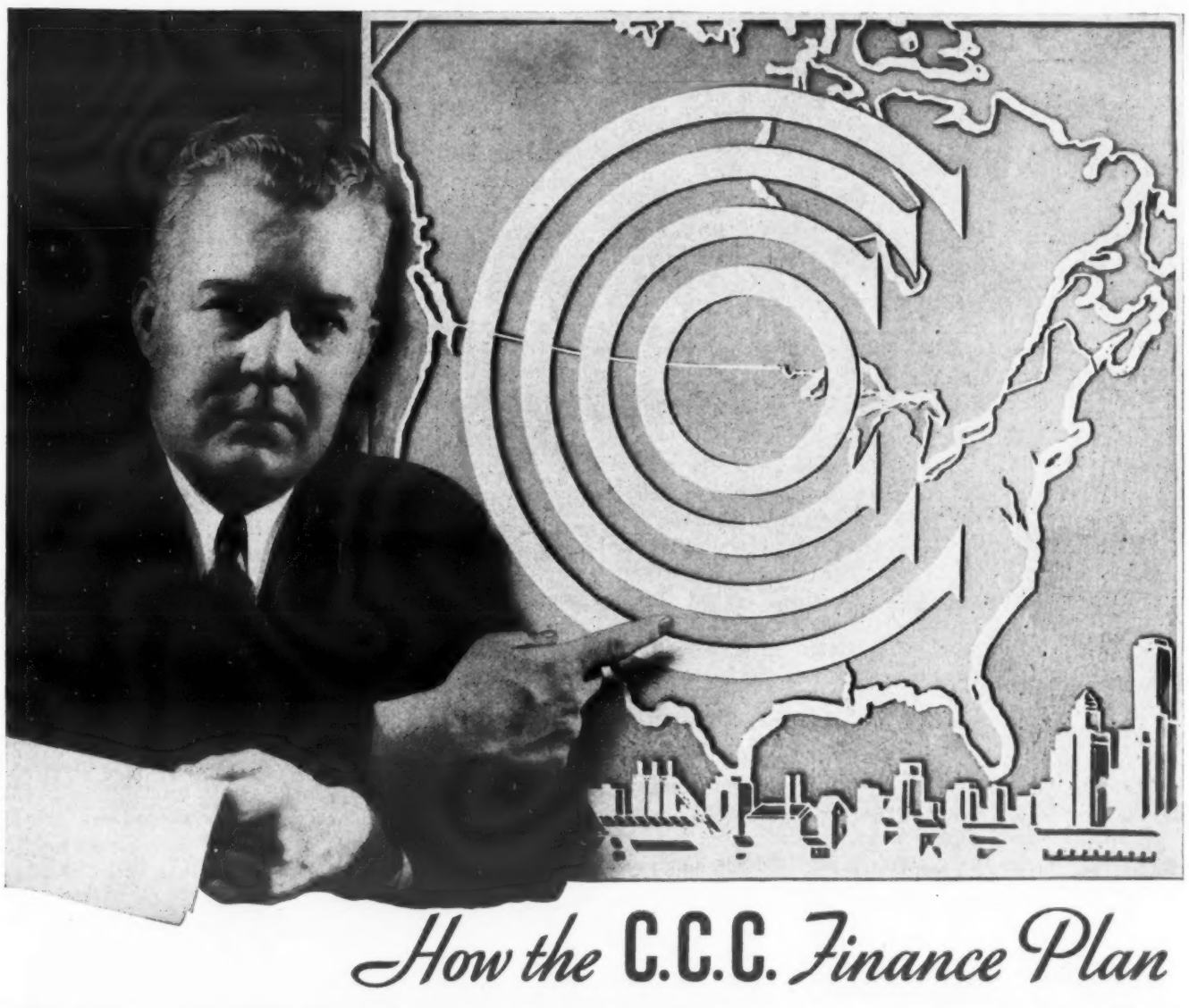
Ben Jasper, veteran of more than 12 years of electric appliance merchandising, is manager of the new branch.

Opening of this branch, as well as others in the city and in various county seats of the surrounding territory, is part of the expansion program planned by the Lion Store, Mr. Adams says. In line with this program, the store recently opened a branch in Bowling Green, under the management of William Wright.

Burger-Phillips Establishes Appliance Department

BIRMINGHAM, Ala. — Burger-Phillips Co., department store, has opened an electrical appliance department on the sixth floor of its new building, after spending approximately $20,000 in remodeling this floor.

Kelvinator refrigerators and RCA-Victor radios will be featured in the department.



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Using Direct Mail Effectively

DESPITE the widely accepted notion that, theoretically, direct mail is the cheapest form of advertising, experience of specialty-selling organizations in the refrigeration and electrical appliance industries would indicate that, for them at least, it has been the most expensive.

According to several advertising managers who have voiced this opinion, it's not so much a case of the *idea* of direct mail advertising being overrated, as it is of abuse, indifference to, or neglect of the campaigns so carefully worked out by manufacturers.

Literally tons of direct mail literature gather dust on warehouse shelves, field men report, simply because distributors and dealers either believe themselvs too busy with "actual selling" activities to devote themselves to its proper distribution, or because they have not been sold on its merits.

Inadequate Mailing Lists

An even greater waste of direct mail printing evolves around careless and inadequate compilation of mailing lists. As every direct mail expert knows, the list is by all odds the most important factor in the campaign. And only those sales managers who insist that salesmen keep accurate card-index files of their prospects—and the changing status of those prospects—and who then see that such information is translated into selective, classified mailing lists can feel sure that the literature mailed out to help their salesmen gets to places where it will do the most good.

Most effective use of direct mail in the refrigeration industry has been made by "commercial" dealers and salesmen. Their prospects—butchers, bakers, grocers, restaurateurs, dairymen, confectioners, and the like—are well-defined groups of men who are relatively easy to locate and classify. The list problem, then, has been simplified.

Moreover, these sales of commercial equipment require patient education, and instructive literature—either mailed or handed out by the salesmen—is often a big help in enlarging and visualizing for the prospect the nature of the equipment and its potential value to him.

Direct Mail Aids the 'Never-Give-Up' School

In the household field, direct mail has been especially valuable also to those dealers and salesmen who never give up on a prospect. After the salesman has made a number of fruitless calls upon an adamant prospect, and fears that he has worn his welcome, occasional mailing pieces are sent out to keep up the contact, and to help wear down resistance.

Of course any number of strong dealers religiously follow the direct mail campaigns outlined by manufacturers, maintain unimpeachable lists, and get good results. Encouraged by the showings of such "star" dealers, there is a strong movement running currently to educate the nation's dealers and salesmen up to a greater appreciation of direct mail, and its proper use.

Do the Dealers Need Education?

Many sales executives believe that one trouble with the situation is that manufacturers have tried to do too much. They design the campaign, print the literature, and do everything but address it and stamp it. If the dealer were taught some of the principles of direct mail advertising, and prepared it himself, he might be much more likely to see that it were judiciously used. Having so much of the job done for him, he is not—psychologically speaking—so apt to take an enthusiastic interest in its completion.

Falling in step with this line of thinking, the NEWS presents herewith a few observations on the art of direct mail advertising as it is practiced in the electrical appliance industry, culled from reports on the activities of dealers who have set out to acquire their own experience in the matter.

Brevity and Clarity Should Be Foremost

First of all, practically everybody agrees that simplicity should be the keynote. The message must be so clearly put, and the language so plain and unadorned, that its meaning cannot be mistaken. Brevity and clarity are far more important than gorgeous illustrations, fancy printing, and trick get-up.

Second, the major appeal must strike directly at a fundamental interest of the prospect—his home, his health, his business, his standing in the community, his family, his pocketbook.

Variety of approach and freshness of appeal must be achieved for every new mailing of the series, otherwise the prospect will lose, rather than gain, interest as the campaign progresses.

'Last Chance' Letter Is Bad Technique

Last chance appeals, intending to stir the prospect to act at once, are eschewed by the electrical appliance industry. A final letter must really be the last; for, except in infrequent cases, an extended offer following a 'last" letter destroys the prospect's confidence. And most dealers do not like to "close the books" on any prospect until he has been sold.

The choice between a single-letter campaign and a letter series is generally made in favor of the latter. Expensive merchandise and specialty articles require more time and sales effort than most other products; hence a several-letter campaign is usually interested.

When Should the Letters Be Sent?

In the matter of deciding upon what days of the week and year it is most advisable to have letters delivered, surveys have shown that prospects are apt to spend more time reading mail on Tuesdays and Fridays; whereas Monday and Saturday mail is the most neglected. New Year's and Christmas days should be given a wide berth, along with Independence Day, Labor Day, and Easter.

In general, direct mail is more apt to be read during the colder months. July and August, popular vacation times, are also great waste-basket months.

Methods for Getting Prospects to Buy Now

In common with every salesman, the direct mail letter writer has to face the problem of making his prospects buy *now*, not sometime in the indefinite future.

Some of these "urgency" appeals which are used by the form-letter writer include time limit, rising prices, free gift, special goods, used or out-of-date merchandise, cut prices, shortage of goods, this-is-the-best-time-of-year, introduction of new models or products, and anniversary celebration.

Many specialty distributors advise the use of a cartoon, plus an action-producing message, on the reply form. This message should be designed to remind the prospect of the benefits he will receive by filling in the blank and sending it off at ance. An added mental stimulant to immediate action, the semi-humorous cartoon is a most effective addition to the reply card.

Enclosures by the Dealer

Enclosures (illustrative or descriptive printed material which accompanies the form letter) include the single-page leaflet, the folder, the booklet, and the house organ or magazine.

Dealers sometimes go in for advertising blotters and calendars of their own; but for the most part they rely on the expensively printed, highly pictorial folders and pamphlets provided by manufacturers. The letter is written to convince; the enclosure creates desire. One is indispensable to the other.

Enclosures should never appear crowded, the story they tell should be logically developed and carried from page to page, use of photographs should be liberal, and particular attention must be given to "tying in" the enclosure with the letter so well that the prospect's interest will infallibly be drawn from one to the other.

Blotters Are Good Reminders

Blotters and calendars are favored by dealers—particularly by small-town merchants—because they may be kept in sight and in use over a long period of time, continually repeating their messages to the prospect.

Important to remember in this connection is that calendars and blotters should carry more than the name of the firm donating them. They should tell by illustration, or action-producing message, a *reason why* the product they advertise should be purchased. In the case of the calendar, each leaf should present a fresh slant on the single objective that all its messages are trying to attain.

When testimonials are used for enclosures, they must appear convincing—not obviously "hopped up"—and permission from the writers for their use should be secured in advance. Present tendency is toward the use of testimonials from "just folks"—middle class users—who reside in the dealer's locality, and whose names are likely to be recognized by his prospects.

Too much literature should not be included in a single mailing. A moderate number of enclosures (not more than two or three) will not only make individual mailings less expensive, but will contribute to the effectiveness of the letter. Dealers have also found it advisable to conserve their enclosure literature, so as to have plenty available to spread out over a protracted series of mailings.

Using the Broadside

The broadside, also much used by specialty dealers, is simply a folder which is not mailed in an envelope. One face is left blank for addressing. It is really a kind of billboard on paper, depending for its effect on a flashy, catchy sales story, big type, and large illustrations.

The more successful broadside types employ an illustration and a phrase on the addressing face as an attention getter to "lead in" to the copy within. It is essential that the front be so designed that it be clearly distinguishable from the back, otherwise the broadside may be opened incorrectly and the continuity of the sales story broken.

Penny-postcard advertising (the "penny billboard") is well adapted to the dealer's local advertising needs. Government postal cards can be cheaply produced, even with illustrations. Most dealers concede that those cards which employ illustrations—especially of the cartoon variety—are fully 30% more productive than those which depend on straight copy alone.

In spite of the limited space afforded by a postcard, the material should not be crowded. It is sometimes unnecessary to use any space for headlines if proper illustrations are used. Short words and sentences pack a punch, and are best suited to the postcard.

The Simple Essentials

When you get right down to it, there is no great trick to direct mail advertising by specialty dealers. Outside of a few general observations on procedure, there isn't much to be taught outside of:

(1) Having a complete, carefully checked, up-to-the-minute mailing list;

(2) Having something to say; and

(3) Saying it clearly and simply.

As a means of paving the way for a salesman's call, of maintaining a prospect's interest after the call, of filling in and rounding out the educational job, and of getting under the hide of tough prospects, direct mail has a valued place in the specialty selling formula.

Every dealer and salesman in the industry should find it worthwhile to study the subject, to make intelligent use of the materials furnished by his manufacturer, and to adapt the idea to the local needs of his own territory.

— LETTERS —

Oh, Oh! That Man Is Here Again

18260 Monica, Detroit, Mich.
April 3, 1937.

Editor:

At it again, I see.

What has "Grab It While You Can," your editorial of March 31, got to do with air conditioning and refrigeration?

A spot editorial reporting the current scene occasionally is refreshing. Your devotion to political blah unfortunately is not occasional.

Your defense for bringing such stuff into a trade paper issue after issue is pretty thin. You would like to avoid the question. I have no right to voice an opinion, you say, because I am not allied with the industry nor a subscriber to your paper.

If you confined your editorial discussions to air conditioning and refrigeration the dodge might hold water. Politics! Governments! War! A non-subscriber of course has no right to an opinion. But what of the thousands of readers who look for air-conditioning and refrigeration news in the NEWS. If somehow you stuck to your business, outsiders might stick to theirs.

I did enjoy your explanatory paragraph: "In that we are writing largely to an audience which agrees with us in principle, the effort may appear a bit futile, although we do believe we are rendering readers a service by putting their feeling into words they can quote."

How modest. Of course they appreciate your teachings. "The ABC of political expression," by Professor Taubeneck. But why prostitute the editorial columns? You could open a correspondence school.

Where do you get your statistics?

". . . the reason that howls of protest from loyal Roosevelt supporters have *not* been mailed us is that the NEWS is voicing editorially a sentiment which is representative of enlightened business thinking throughout the industry."

Perhaps you took a straw vote. Just how many subscribers do you represent, I wonder. Can you name three?

"The Editor says so" doesn't make it so. You're in no position to play fast and loose with facts large *or* small. Before trying to pass off your hysterical opinions as editorial matter, why not come up for air and looK around? Your sidestepping throughout your answer of March 17 was as fancy as it was convenient. Congratulations.

DR. LEIMAN MCINTEE

Answer: We hope that readers aren't becoming bored with our little private feud with Dr. Leiman McIntee. The good doctor must be having a great deal of fun preparing his collections of meaningless invective—on dull evenings when he can't find any neighbors or relatives to bite—and we must confess that his letters brighten up rainy Mondays for us.

As readers can see, there isn't much about this last letter that needs to be answered. A non-subscriber, Dr. McIntee's heart bleeds for the thousands of subscribers who, he believes, aren't getting their money's worth. Cries he: "But what of the thousands of readers who look for air-conditioning and refrigeration news in the NEWS."

The answer is:

They get it.

Proof? The practically unprecedented and unduplicated (according to auditors from the hard-boiled Audit Bureau of Circulations) number of subscriptions which come in by mail, unsolicited, the unusually high renewal percentage, and the notes of praise and gratitude for a job well done which accompany the orders.

"Just how many subscribers do you represent, I wonder. Can you name three?" queries the doctor.

My good man, we can not only name three, but three hundred—by their first names, at that. As a matter of fact, the editor's personal acquaintance among subscribers—gained during seven years of editing the paper and visiting readers throughout the United States and foreign lands—undoubtedly runs to more than three thousand. And how many do you know, Dr. McIntee?

Motor Ratings a Secret?

Bendix Music-Electric Shop
27 East Main St., Walla Walla, Wash.
March 26, 1937.

Editor:

We are in receipt of the March 16 issue of the REFRIGERATION NEWS with specification booklet on household refrigeration and note that this is quite different from those usually published in so far as it doesn't give the horse power rating of the motors.

Has it come to the point where too many of these are so underpowered that they are ashamed or afraid to have the public know? It would seem to us that this is a point that the public is entitled to have the fullest information on, and we feel that this is just one more step in making a racket out of the refrigeration business.

H. F. BENDIX.

THE AIR AGE

Air Conditioning to Chase the Jinx Away

BY F. O. JORDAN

Gimbel's, Pittsburgh department store, stood just on the ragged edge of the 1936 St. Patrick's Day "Billion Dollar Triangle" flood.

Since this big department store stood outside the actual flood zone, it seems that it might have been spared. Yet the 1st, 2nd and 3rd basements were filled with flood-waters. And, of course, the entire establishment suffered from the suspension of trade while Pittsburghers were too occupied with other affairs during and after the flood to think much about department store wares.

In fact, things got so bad with Gimbel's that they had to do something to chase the jinx away and lure the customers in. Instead of weeping and gnashing their teeth, the management threw 700 brand new tons of air conditioning right in the face of disaster just to show what they thought of Pittsburgh's future.

Now it is said by the store management that "patrons shop in comfort the whole year around, and are **especially attracted to the air-conditioned store in the summer,**" and furthermore that "clean, washed air practically eliminates former losses in mark-downs," that "the effect of air conditioning on the health as well as sales attitude of the employes (and customers) is valuable and profitable to the store," and that air conditioning "places the entire business on a higher plane."

Potential Market for Air Conditioned Hotels

Just as in most other markets for air conditioning, the air conditioning of hotels has progressed only far enough to prove it to be a very desirable feature as well as a paying investment for the purchaser.

Toward the end of this decade, air conditioning doubtless will yet offer attractive possibilities. However, at this stage of the current decade, air conditioning occupies the unique position of having gone only far enough to have served as conclusive proof of its own general desirability to the bulk of its potential users who, although convinced, have not yet signed the dotted line.

From now on it is principally a matter of order taking, and of how fast the manufacturers can build themselves up to the enormous possibilities of the market. In turn, this latter consideration depends upon the elimination of the present "bottle neck" formed by the serious shortage of trained technical man power.

As a specific case, consider the present hotels of 100 rooms or over, as air conditioning for hostelries of this size and larger has been proven to be a very paying investment, although the smaller establishment is by no means out of the picture.

The total number of guest rooms in hotels of 100 or over is said to be approximately 1,000,000 rooms, of which 0.375%, not much more than **one-third of 1%,** now are air conditioned. Air conditioning has progressed somewhat faster in the public and leased places (coffee shops, restaurants, grilles, etc.) of such hotels, as approximately 10% are said to be air conditioned already. However 90% is still a lot of territory.

When one hotel in a community is air conditioned, it is not surprising that its trade increases, as it is assumed that such progressive and solicitious policy naturally will draw customers away from less modernized and comfortable competitors. But what about the status when all hotels are conditioned, will they be back right where they were before when the lure of comfort was common to all of them?

The answer already has been proven in many communities, for the air-conditioned establishment does not draw its additional trade entirely from non-conditioned competitors, a considerable portion of the increase resulting from the fact that people begin making use of the type of service offered, who did not use it in any form before.

For example, air conditioning draws customers to restaurants who once ate at home or picnicked in the open; and old customers eat more than when they were so warm that the trickle of perspiration chased them out of doors as soon as they could grab a small snack.

It also draws folks into hotels during the season when they once avoided the terrible discomfort of the summer-bound hotel at all costs.

So the addition of air conditioning does not leave competitors at their familiar status quo, but has been proven actually to increase the possibilities of entire industries. Therefore, watch out for the new guest rooms which undoubtedly will be added to the million-odd present ones mentioned above by new hotel construction, when air conditioning lures more guests into hotels than present hotels can accommodate.

"Time" on Trane

Celebration last month by the Trane Co. of its fifth addition to the plant, the 25th anniversary of its entrance into the manufacture of heating equipment, and the 50th anniversary of its founding, was given recognition in the "Business and Finance" section of the Mar. 15 issue of the newsmagazine "Time."

Under the headline "Happy Trane" the article in "Time" says:

"Not to be confused with Chicago's big Crane Co. is prosperous little Trane Co. of La Crosse, Wis. Both sell comfort to the U. S. public, but there the parallel ends. Crane last week reported 1936 profits of $5,600,000 on sales of $78,000,000. Trane was proud to show earnings of $325,000 last year because it topped its previous record (1930) by more than 50%. And that profit was made on sales of only $3,000,000.

"Trane was a pioneer in air conditioning and is now beginning to cash in. It has had preferred stock outstanding in public hands for years but the common has always been tightly held by the founder's family and friends.

"Last week it filed a registration statement for 255,000 shares of common, 62,500 shares of which will be offered to the public to finance further expansion.

"In La Crosse last month the company held a jamboree in celebration of the opening of the fifth addition to the plant, the 25th anniversary of its entrance into the manufacture of heating equipment and the 50th anniversary of its founding as an obscure plumbing shop by James A. Trane.

"Plumber Trane's son Reuben went to the University of Wisconsin where he was captain of the crew. Not long after he graduated in 1910, his father decided to incorporate as a manufacturer of heating and plumbing supplies, made Son Reuben president, the job he has held ever since.

"Father Trane is dead and it was Son Reuben who put the company into air conditioning. Progress was slow. As late as 1920 there were only 40 on Trane's payroll, only 159 by 1927. Today the total is nearly 1,000. On the day the new plant was opened last month with speeches, dancing and free beer, all the La Crosse employes chipped in to buy a half-page newspaper advertisement, surprising their boss with a THANK YOU, MR. TRANE.

The message was signed by every Trane employe from Gottfried Abegglen to Leonard Zielke.

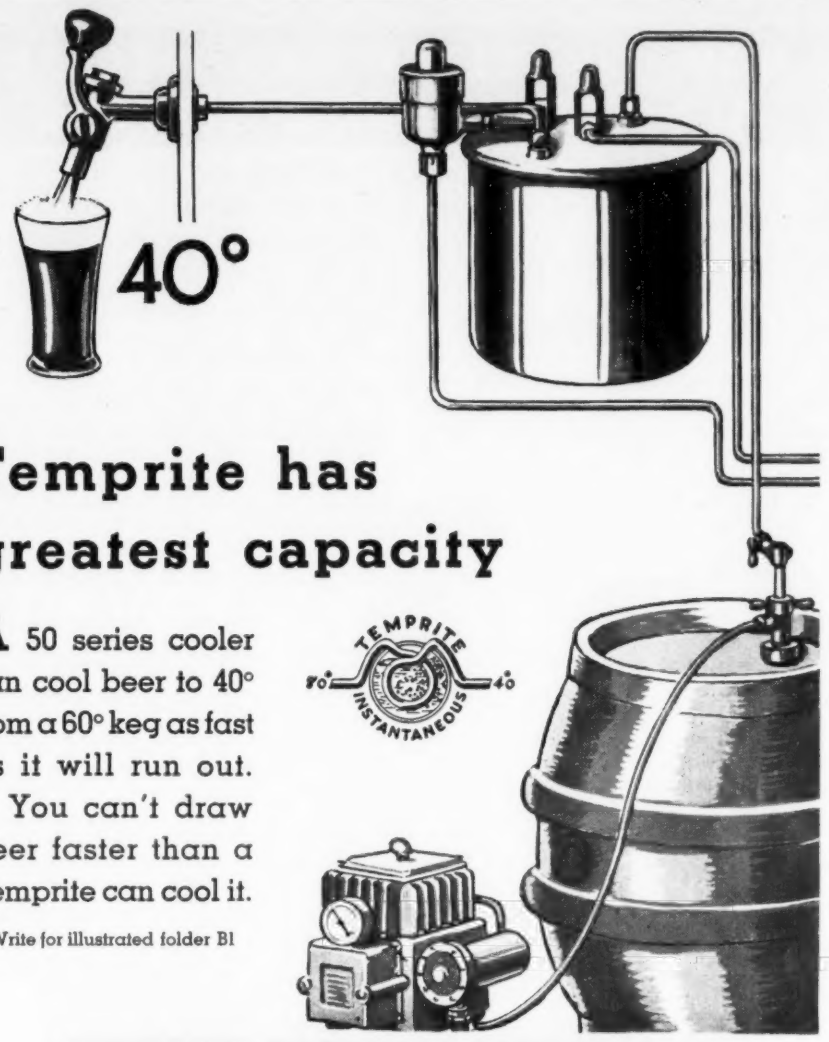
"Tall, ruddy, white-haired at 48, President Trane is 'Rube' to all La Crosse. In addition to his workers' THANK YOU, he got an 8-ft floral valentine from the Trane Employes' Club as 'The Merry Old Chief.' An engineer by training, he owns 49% of his company's stock, his wife another 17%.

"Trane Co. makes virtually every type of air-conditioning equipment except a heating unit, its specialty being the coils which it supplies to other air conditioners, including General Electric.

"Trane systems have been used on such major jobs as the New York Life Insurance Co. building in Manhattan, Wrigley Tower and Sears, Roebuck's building in Chicago, the House of Representatives office building and Supreme Court building in Washington.

"Touted as one of the new applied sciences that were going to bust the slump, air conditioning is still small potatoes. The industry's total sales last year were less than $60,000,000 compared with some $38,000,000 the year before.

"But the rate of growth in small air-conditioning concerns like Trane has been impressive. In 1933 Trane's sales were a piffling $743,000. Two years later they were $1,700,000. For 1937 the company has set a quota of $5,300,000, which would be 75% better than 1936."

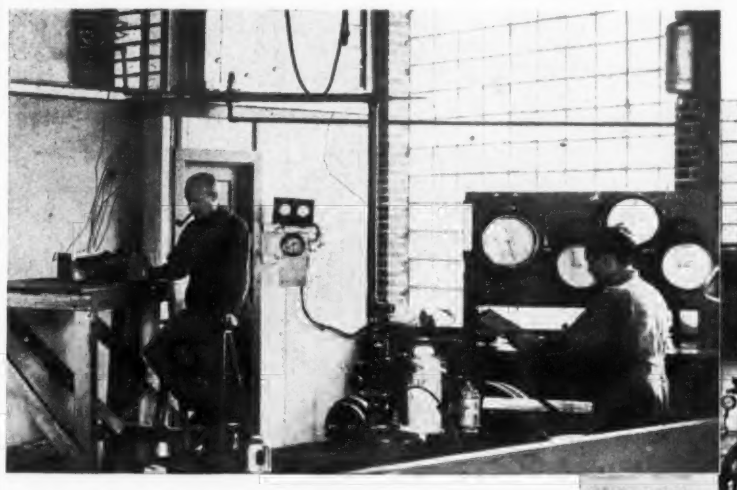


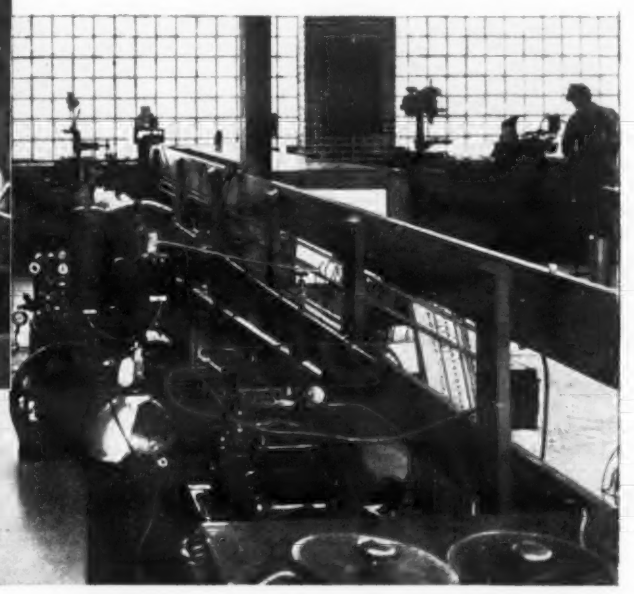
Temprite has greatest capacity

A 50 series cooler can cool beer to 40° from a 60° keg as fast as it will run out. • You can't draw beer faster than a Temprite can cool it.

Write for illustrated folder B1

TEMPRITE PRODUCTS CORPORATION
1349 East Milwaukee Ave., Detroit, Michigan
ORIGINATORS OF INSTANTANEOUS LIQUID COOLING DEVICES





Shown above are two views from the Alco laboratory test floor with research under way on control problems.

ALCO ENGINEERING *covers the entire field of refrigerant control*

When you are up against a problem in refrigeration—remember that Alco Engineering covers more than valves. Every factor in any way affecting the control of refrigerants is constantly under study by our Engineers. Especially are we interested in the *application* of control valves. Tests in the Alco Laboratories, and recommendations of Alco experts, have increased evaporator capacities from 25% to 100% over the original rating. Research constantly under way — explains in great measure the leadership accorded Alco valves by the industry.

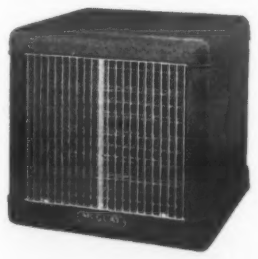
Consult us on your refrigeration problems. Alco Engineering, generally regarded as the most able in the field of control, is entirely at your disposal.

ALCO VALVE CO., INC.
2620 Big Bend Blvd.
St. Louis, Missouri

THERMO VALVES HIGH PRESSURE FLOAT VALVES
EXPANSION VALVES — MAGNETIC STOP VALVES — LOW PRESSURE FLOAT SWITCHES

McQUAY McQUAY

McQUAY COMFORT COOLERS



For direct expansion refrigerants; also available as combination cooling and heating units, where cold water or brine is used as the cooling medium, and where steam or hot water as the heating medium . . . The ideal simplified cooling unit . . . Precision built! Numerous sizes with capacities to fit any requirements.

WRITE for New Catalogs on McQUAY Unit Coolers, Comfort Coolers, Cabinet Concealed Radiation, Refrigeration Coils, Ice Cube Makers, Air Conditioning Coils, Blast Coils, Combination Heating and Cooling Units, Suspended and Floor Type Blower Coolers, Cabinet Floor Type Room Coolers, Etc.

McQUAY Inc.
MINNEAPOLIS MINNESOTA.

HOW TO SELECT AND INSTALL AIR-CONDITIONING SYSTEMS

By T. H. Mabley, Chief Engineer
Mechanical Heat & Cold, Inc., Detroit

Case No. 10

A Residence

The residence shown in Fig. 1 is at the present time heated satisfactorily with a steam boiler and a two-pipe radiation system. The owner is particularly interested in having the comforts of summer air conditioning for the major first floor rooms, and one bedroom on the second floor.

It is also intended that the additional functions of air cleaning, ventilation, and humidification for winter conditioning be included. However, since these are secondary features the selection of equipment is based upon the summer cooling and dehumidification requirements.

Some consideration should be given to heating of the outdoor air under the item of ventilation. If the outside air is brought into the house by mechanical means it will naturally reduce the infiltration of air through window cracks and opening of doors; in fact it may result in a slight exfiltration of air. This is a desirable feature from the standpoint of comfort because it reduces the objectionable drafts near windows in cold weather.

It will be necessary to raise the temperature of the outside air above the room temperature during the heating season before it can be introduced into the living quarters. This is accomplished by means of a tempering coil.

The outdoor design conditions are selected in the usual manner. In this case —5° dry bulb minimum for winter and 95° dry bulb with 76° wet bulb maximum for summer are selected as outside design temperatures.

In the summer season with the outdoor temperature at the design condition it is desired to maintain an 80° dry-bulb temperature with approximately 50% relative humidity in the conditioned rooms.

With this information and the other data available from a survey of the house a tabulation of the occupancy, infiltration, and conduction loads can be made and the heat gain calculated for each of the rooms.

Since cooling is the major function of this system the heat gain can be used as a basis to proportion the volume of air to be distributed to each room.

To accomplish this it is first necessary to select the c.f.m. output of the proposed conditioning unit. The total heat gain of the four conditioned areas amounts to 35,400 B.t.u., but at least 15% must be added to this for duct losses and losses due to the fact that the recirculated air is carried through the unconditioned hallway.

By reference to manufacturer's rating sheets for various conditioners it is found that a standard conditioning unit with a rating of 900 c.f.m. will handle the gross heat gain.

With the total c.f.m. figure determined it is possible to proportion the air quantities to each room based on the proportion of the individual heat gain as compared with the total gain figure. The tabulation shows the calculated heat gain and air quantities

Next step is to select the duct sizes. While there are several procedures for sizing ductwork, this particular case is a very good illustration of the velocity method. This method consists of determining the duct cross sectional areas so that a certain desired maximum velocity is maintained in various trunks, branches, and risers.

In any duct system certain velocities are considered usually as the highest air speed that may be used before uneconomically high static pressures or objectionable air noises are encountered. A table of the recommended velocities may be found in almost any engineering data book for air conditioning, or in a fan selection manual. From one of these tables the velocities to be used in this proposed system is selected.

It must be remembered that for a residential installation it is well to keep the air velocity particularly low in the entire duct system to avoid the danger of objectionable noise in the ducts. We have, therefore, used the following in the design of our duct system:

Risers	600 Ft./Minute Max.
Individual Branches	600 Ft./Minute Max.
Main Branches	700 Ft./Minute Max.
Main Trunks	800 Ft./Minute Max.

Next step is to size the risers which will supply air to each discharge grille. This is done by using an air-flow chart which is available in any fan or air-conditioning data book to select the equivalent round pipe area required to handle the c.f.m. in each riser at a velocity of 600 f.p.m. Having determined the equivalent round pipe area, the actual cross-sectional dimensions of the rectangular duct can be selected by consulting tables usually found along with the air-flow chart.

Since most partitions in a residence are built with 2x4 studs it is usually the case that our maximum depth for a wall riser is 3½ inches. With this determining dimension we can select the width of the duct, with the additional limitation of 14 inches which is usually the maximum width available between studding.

When a wall riser requires a wider dimension than 14 inches it is necessary to break it up into two or more ducts. Such is the case with the living room in this installation.

The air flow is split equally into two risers leading to two separate discharge grilles located at either end of the room. This requirement has the advantage of affording a better distribution than in the case of a single riser and supply grille for such a large room.

In the case of the bedroom a somewhat deeper duct can be used as the riser is carried through the broom closet instead of being limited to the depth of a stud space.

On the second floor, however, it will be necessary to split the riser and place it in two adjacent stud spaces. With this arrangement only one large opening, covering the two risers, will be used. Since the room is smaller than the living room—being almost square in shape—additional openings for distribution purposes will not be needed.

The basement ductwork is sized in the same manner, by first determining how much air each section of duct is to handle, and then consulting the air-flow chart to find the equivalent round pipe diameter required to pass that quantity of air at the maximum desired velocity; then determining the cross-sectional dimensions. To make the basement ductwork appear as neat as possible, and also to provide the maximum head room, we will try to use a vertical dimension of 6 inches for the entire system except where the main trunk connects into the unit.

With this dimension determined we can select the width of each branch and main trunk. The width of the main trunk is set at 32 inches which results in a ratio of slightly greater than 5 to 1 for the proportions of the width to the depth of the duct.

While this proportion is slightly high it is not excessive and we can safely use the 6-inch depth throughout the system.

The return air system is a very simple arrangement in which the space between the joists is utilized to carry the air to a point at the rear of the conditioner from which a connection to the inlet plenum can be made.

The joist space is blocked off on the bottom and at both ends of the air travel portion with metal and we have the equivalent of two ducts 14x11½ inches which is large enough to handle the 900 c.f.m. return air. A connection is made for fresh air from the return plenum to a louvre installed in the side of the building.

The unit selected should be equipped with filters and a tempering coil. The tempering coil must have a capacity to heat 900 c.f.m. of air from 55° to 85°. The humidifier with which the unit should also be equipped must be of ample capacity so that it will supply adequate humidification with the unit working on intermittent periods, as will be the case during the winter. The humidifier will be under control of a humidistat so as not to create excessive humidities.

The controls for this system shall comprise a thermostat for the cooling cycle, a temperature control on the heating return line for the heating cycle, a humidistat for maximum winter humidity control, and a damper motor to shut off the fresh air opening when the blower is not in operation. The damper control is essential to avoid the danger of freezing the tempering coil.

An additional control will prove useful for control of the summer cooling cycle at night after the occupants have retired. This will consist of (1) a thermostat located in the bedroom that is to be conditioned, with a switch to throw the control of the refrigeration machine to that point from the first floor control; (2) a time switch which may be set to keep the system running for any desired number of hours after the owner has retired.

The conditioner can be mounted at the ceiling of the basement near the boiler.

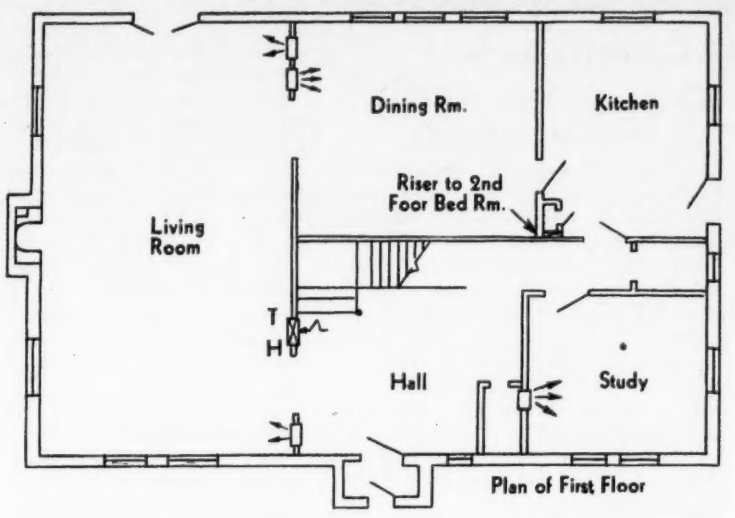
The duct will be placed tight against the ceiling and the risers carried up the walls of each room to a point near the ceiling where they will connect into wall supply grilles of the diffusing type equipped with deflection fins, which distribute the air without localizing the flow in any one spot. The discharge openings will be equipped with shut-off dampers so that any one of the rooms may be isolated.

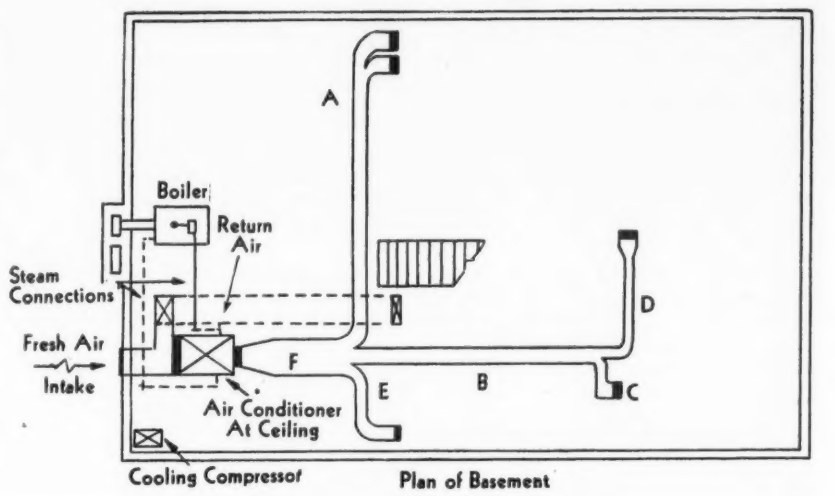
The winter operation of the system will be intermittent as the unit will be controlled by means of a thermostatic control installed in the heating return line from the tempering coil. This arrangement will permit the unit to run only when there is steam available in the system.

When heat is required in the radiators the steam will also be supplied to the tempering coil and the blower will be turned on by this temperature control. The unit will be permitted to operate and provide air circulation, ventilation, air cleaning, and humidification as long as there is a steam supply to temper the air.

In the summer a manual switch will be used to by-pass this control and operate the unit continuously as desired.

Layout for Residence Installation





CALCULATIONS FOR RISERS

Room	Heat Gain	C.f.m.	Round Pipe Diameter (Inches)	Riser Dimensions (Inches)
Living Room*	11,200	142	6.7	3½ x 10
Dining Room	7,800	198	7.8	3½ x 14
Study	6,300	161	7.0	3½ x 11
Bedroom	10,100	257	8.0	4½ x 12
Total	35,400	900		

*Two ducts of equal size.

CALCULATIONS FOR BASEMENT MAINS AND BRANCHES

Duct Section	C.f.m.	Maximum Velocity	Round Pipe Diameter (Inches)	Duct Dimensions (Inches)
A	340	700	9.5	13 x 6
B	518	700	10.8	17 x 6
C	161	600	7.0	6 x 6
D	257	600	8.0	8 x 6
E	142	600	6.7	5 x 6
F	900	800	14.4	32 x 6

The ANSUL Twins

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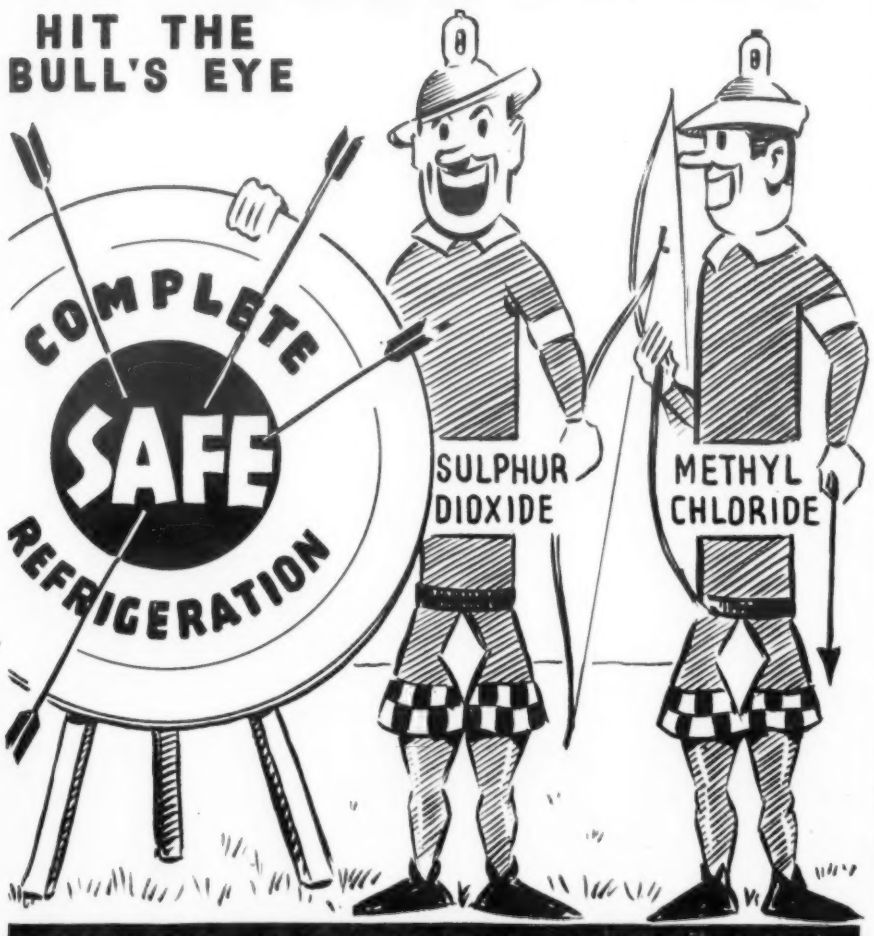

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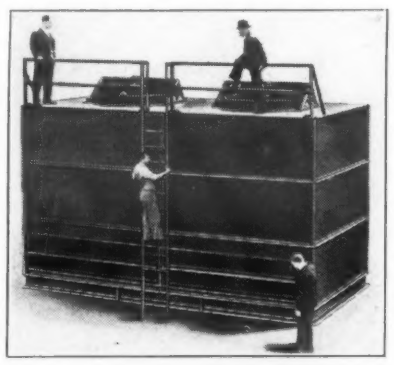

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Alfred P. Sloan Warns of Danger Inherent in C.I.O. Movement In Letter to Stockholders

Editor's Note: Following are excerpts from a letter sent by Alfred P. Sloan, Jr., President of General Motors Corp., to General Motors stockholders, entitled "The Story of the General Motors Strike."

Purpose of the letter was to give the stockholders a better understanding of the steps that were taken, and of the present status of the United Automobile Workers of America as a bargaining agency for those of its members who are General Motors employes.

Readers should be interested in Mr. Sloan's discussion of the aims of the union, and the methods it is using to gain its ends.

Particularly interesting is Mr. Sloan's statement of the present status of the union as an agency for collective bargaining for its members only.

THE REAL ISSUE

The first question that naturally arises, when a conflict of this character develops, is:—what are the underlying causes? Where does the fault lie? Have there been shortcomings on the part of management? Has management been selfish or unreasonable in its treatment of its workers?

It was first my intention, as a part of this message, to discuss that phase of the problem and to establish the facts in relation to the above questions. At this time, however, I do not believe it is necessary—time has provided the answer.

The case appears to be perfectly clear. Official statements made both before and during the negotiations, the settlement itself, and independently the similar occurrences involving other units of industry, serve to clarify and confirm the diagnosis now being made.

It makes a misunderstanding practically impossible on the part of any one familiar with the news of the day and the general trend of industry's industrial relations.

Briefly stated, the strike against General Motors Corp. was not actuated by any fundamental causes that affected, in an important degree, the welfare of its workers. I am quite convinced that this is an unprejudiced statement of fact.

It is demonstrated by the further fact that there was very little at issue in the whole argument that affected their direct interests. A preliminary understanding resulting in the return to work, related solely to the status of the C.I.O. union as a bargaining agency.

As a matter of fact, the circumstances could hardly have been otherwise, for the reason that as is very generally recognized, working conditions, including the wage scale, and the hours of work, in the automotive industry and in General Motors, are such that the automobile worker stands as the most favored of all workers in American industry. And this has always been so.

Further, the industry is continually working aggressively to improve even still further, the status of its workers. Wages have been consistently increased and hours of employment reduced so far as economically practical. And improved operating technique has made possible greater continuity and security of employment.

Such being the conditions under which the industry was operating, then what was the real objective? No assumptions are necessary. The answer can be found in the official statements made from time to time by the leaders of the C.I.O. movement.

The purpose was to obtain the maximum possible recognition, carrying with it the greatest degree of power with a view to controlling not only the workers within General Motors, but of the entire automotive industry and ultimately, so far as possible, all workers employed in mass production industries.

That movement is now in full swing. To the extent that it becomes successful, if the precedent already established in other industries now dominated by the same leadership is to be the guide, industry faces the closed shop with the check-off.

The implications to be drawn from the logical evolution of this movement, are of serious economic and political consequences and jeopardize the welfare and security of all.

Now, what is the technique employed in the effort to attain this objective?

First, a demonstration of the power to paralyze the productivity of industry. Thus it places in jeopardy, as in the case of General Motors, the economic position of many important communities and causes loss and suffering to millions of innocent bystanders. In that way, it adversely affects the national economy, as a whole.

And this is being accomplished through coercion of the workers and the illegal seizure of property. The fact that the worker support in many cases, is a small minority, is immaterial.

Through the established technique there is denied to all, the right to work. In the case of General Motors, 125,000 workers opposed to the movement, suffered loss of income for many weeks, amounting in the aggregate, to tens of millions of dollars.

But that is only the first step. Next, comes the capitalization of the power thus demonstrated by forcing additional workers to join the movement.

Then comes the demand to represent all workers exclusively. Next, the closed shop. Each worker must then not only pay for the privilage of working, but he must pay for the privilege of continuing to work.

Finally, comes the check-off. Then each worker must not only pay for his job, but in addition, special assessments, whenever and for whatever purpose the organization demands.

And the worker is in no position to resist. The tribute is taken out of his pay envelope by the employer on the demand of the union. That is the final step. It is the real objective.

Manifestly, such a procedure carries with it the implications of the greatest possible danger. It places the productivity of industry at the mercy of a labor leadership, responsible and accountable to neither the law nor the workers, and restricted solely by its own desires and ambitions.

The dangers of such a centralized control of the American worker, are obvious. Its political implications challenge democracy as a fundamental principle of government.

To the extent that it succeeds, it means the economic and political slavery of the worker, and an important step toward an economic political dictatorship.

Let us consider, for a moment, the matter of the "sit-down" technique. The theory advanced is, that a worker having not only a vested right in his work, but in the property of the business for which he works, therefore is entitled to "sit down" on the job. And even if only in a small minority, he can deny all others the right to work.

Such a contention means, that the ownership of property carries with it only limited control. Part of the control is lodged with those who happen to be employed in the property at any particular time.

The theory assumes that this part control owes no obligation to management, stockholders or dissenting workers, even if dissenters are in the majority.

Indeed, it goes even further and denies the right of the duly constituted branches of government to interfere. It is subject to no control except by labor leaders, great or small.

It is unnecessary to say that such a theory and procedure, are both untenable and illegal.

It is revolutionary in its dangers and implications. It should be dealt with by those responsible for law and order, just as aggressively as all other offenses in which the safety and welfare of the community are involved. The sooner that be recognized, the better for all concerned.

(*Editor's Note*: At this juncture Mr. Sloan reviews the history of the strike and the negotiations.)

IN GENERAL

In view of the fact that the prime issue involved in the whole situation was the status of the union as a bargaining agency, it is important to point out, definitely and concretely just what that status now is. This is particularly true due to the fact that claims have been made entirely beyond any possible interpretation of the agreements themselves.

The United Automobile Workers of America is recognized by General Motors Corp. as the collective bargaining agency for its members and for its members only.

The letter to Governor Murphy does not in any sense broaden the position of the union. The letter distinctly recites that the corporation can not do anything to deny the rights of collective bargaining to those entitled to same, neither can it make any agreement which fails to protect them in that right.

On the other hand, it can and did agree that in collective bargaining the bargainers should be truly representative of a body of General Motors workers. It was willing to have Governor Murphy decide as to the facts. A contrary position would be an attempt to prejudice one organization of workers as against another. All must have equal treatment.

This message has been prepared, having in mind the fact that the great majority are interested in the general points and in their implication, rather than in a technical presentation of a more voluminous record.

It is impractical to make any estimate of the loss to the stockholders resulting from the practical suspension of activities for a period of approximately six weeks. Such an estimate would involve too many assumptions. Such losses were most consequential, however, and can never be regained.

It is also recognized that the losses of the corporation itself represent only a small part of the losses as a whole. The workers, the suppliers and their workers; the dealer organization, the transportation companies, all suffered, as did other groups as well—in fact, the whole tempo of business was slowed thereby.

The total loss, directly and indirectly, to the national economy, could conservatively be estimated at many hundreds of millions of dollars. In industrial conflict, as in many other forms of warfare, everybody loses, irrespective of the result.

Armstrong Cork Announces Changes in Personnel

LANCASTER, Pa.—Several changes in its administrative and executive personnel have been announced by Armstrong Cork Co.

C. Dudley Armstrong, grandson of one of the company's founders, has been elected vice president and secretary to succeed William R. Hamilton, who retired after 47 years of service as employe and officer.

H. R. Peck, for the past two years general manager of the building materials division, has been elected a director of the company. Mr. Peck joined Armstrong in 1920 as salesmen in the floor division, and helped establish the building and materials division.

John P. Young, assistant advertising manager, will succeed Arthur K. Barnes as advertising manager when the latter leaves, May 1, for Fontana, Calif., to become vice president in charge of sales for Fontana Farms Co., a community development firm. Mr. Barnes has been with Armstrong 20 years, the past five as advertising manager.

Ralph Winslow has been appointed assistant advertising manager.

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Synopsis of Service Manual

On this page is a continuation of Chapter 7 of the COMMERCIAL SERVICE MANUAL by K. M. Newcum, author of the popular MASTER SERVICE MANUAL.

A summary of the previous instalments follows:

Chapters 1 and 2 were omitted from the NEWS, as they are of basic material which has previously been covered in the paper, but they will appear in the completed book.

Chapter 3, Cylinders, Valves, and Safety Devices for Refrigerants—Aug. 5, 12, and 19.

Chapter 4, Methods of Transferring Refrigerants to Smaller Cylinders—Aug. 19.

Chapter 5, Drying of Refrigerants—Aug. 26.

Chapter 6, Commercial Condensing Units—Sept. 2, 9, 16, 23, 30; Oct. 21; Nov. 4, 11, 18, 25; Dec. 2, 9, and 16.

Chapter 7, Evaporators and Refrigerant Control Valves—Dec. 23, 30; Jan. 6, 13, 20, 27; Feb. 3, 10, 24; Mar. 3, 10, 17, 24, and 31.

Correction

In the March 24 instalment of the Commercial Service Manual, under the sub-head "Principle of Installation," appeared the following: *Bubbles in the liquid circuit when the system is in operation will indicate a shortage which might not be detected otherwise. This is especially important with methyl chloride or Freon-12 SO_2 not as critical, and the frost line method is usually fairly accurate.*

The second sentence should have read: *This is especially important with methyl chloride or Freon. SO_2 is not as critical, and* etc.

Frigidaire Blower in Walk-in Cooler

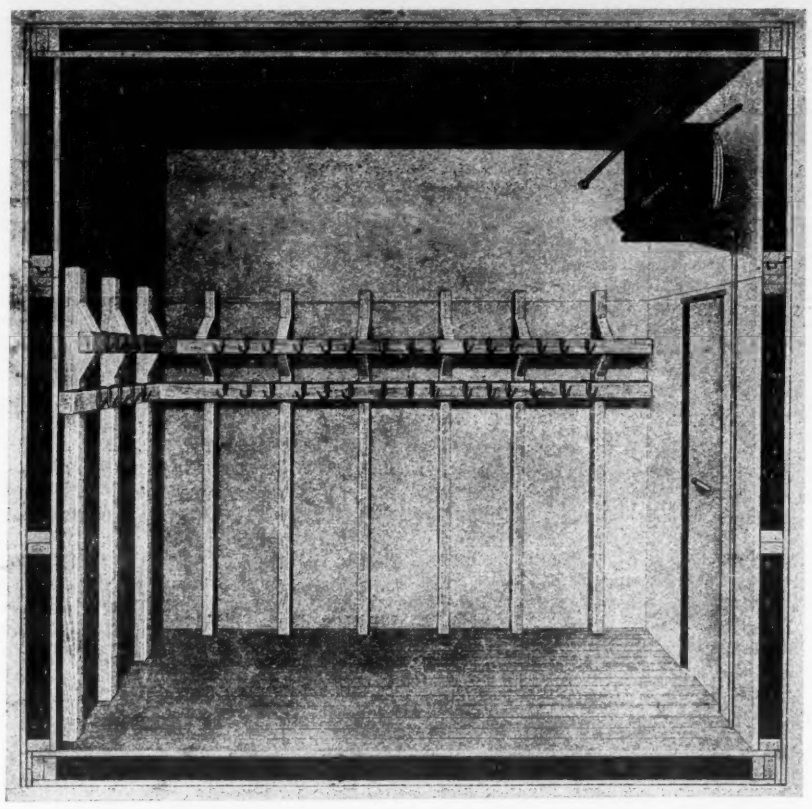


Fig. 156—Frigidaire blower unit installed in walk-in cooler, just above door, so that warm air entering at that point will be drawn up and immediately cooled.

COMMERCIAL REFRIGERATION SERVICE

Proper Installation of Forced-Draft Coils; Freezer Compartment Coils

CHAPTER 7—Evaporators & Refrigerant Controls (Cont.)

BY K. M. NEWCUM

It is also a known fact that blower units operate better on a shorter cycle than a regular fin coil does. This fact should be taken into consideration when duplexing a blower unit and a fin coil.

It is possible to balance the two in such a way that both will operate satisfactorily. This is best accomplished by using a larger capacity blower and fin coil than the job calls for. The higher capacity fin coil would reduce its box temperature with a shorter on-cycle, thereby eliminating the long drag or running time usually necessary. This shorter running cycle would allow both coils to defrost at regular intervals. The reason for the larger blower unit is to provide a longer holdover or longer off-cycle to balance more closely with the fin coil.

Where this balance cannot be attained, it is necessary to employ additional control valves. There are several workable combinations.

One example could be a duplexed blower and fin coil job in which the temperature in the blower coil fixture dropped too low during the longer cycle necessary to cool the fin coil fixture. This low temperature would cause the blower coil to frost up too much.

In this case an automatic regulating or constant pressure valve may be installed in the section line of the blower coil and so adjusted as to keep the suction pressure high enough during this prolonged cycle to maintain the fixture temperature at the desired point.

SLOWER FROSTING

By keeping the suction pressure higher on the blower unit, the frost accumulation would be slower because of the higher evaporator temperature.

A snap-action valve could be used to serve a similar purpose. In this case the low-pressure compressor control would be set to operate the fin coil, and the snap-action valve installed in the suction line of the blower coil. The valve should be adjusted to cut out at the lowest desired temperature of the fixture, and to cut in just after the blower coil has been completely defrosted.

In either event the result would be that the blower coil would be working at a higher suction pressure and temperature than the fin coil. In all such cases it is possible that during the off-cycle of the compressor the warmer gas from the blower unit will travel over via the suction line to the colder fin coil and condenser therein. This would tend to balance the pressures and temperatures in the two coils, and to result in the temperature in the blower coil fixture rising too high, for the colder coil would be holding the compressor switch off.

USE OF CHECK VALVE

This can be corrected by installing a check valve in the suction line of the fin (colder) coil. The check valve would not allow the warmer gas to enter the colder coil, but would actually cause the higher pressure to start the compressor when needed for the blower coil fixture.

Another method used to control this type of job is to control the fin coil with the pressure control using a check in the suction line; then control the blower coil operation with a combination thermostat and solenoid valve either in the suction or liquid line.

With this hookup, place the thermostat or thermostatic bulb in the blower unit fixture and connect it to the solenoid valve. When the temperature in the blower unit fixture reached the desired cutting-out point, the thermostat would cut out, deenergizing the magnet in the solenoid valve so that it would close thus stopping the flow of refrigerant in this coil.

When the temperature reached the cutting-in point the thermostat would cut in and open the solenoid valve, putting the blower unit back into operation.

HAND SHUT-OFF VALVE

With any of the two-temperature arrangements, it is advisable to provide a hand shut-off valve in the line to the fin coil so the user may shut it down for defrosting if, due to the shorter cycle of the blower unit, the fin coil collects frost.

Bear in mind when using blower units that 100% of their capacity must be used at all times. By this it is meant that the expansion valve must be so adjusted that all of the coil surface is being utilized. If the unit is not equipped with a dryer coil or heat interchanger it should be so equipped.

A Frigidaire blower unit installed in a walk-in cooler may be noted in Fig. 156. It is placed near the top of the cooler so that the main air current is above the products and is immediately above the walk-in door. The theory of placing the unit over the door is that the warm air entering at that point will be immediately drawn upwards into the unit and chilled.

The units should also be placed so that the circulation is the long way of the refrigerator. There is no preference in a square box except that the unit should be placed over or near the walk-in door.

DIRT COLLECTING

Blower coils have a tendency to collect dirt and dust which is circulated around by the fan. This accumulation not only reduces the capacity of the coil but is also unsanitary. It is advisable to thoroughly clean the coil with city water pressure from a hose at regular intervals.

A very interesting adaptation of the forced air principle as applied to cooler coils may be noted in Fig. 157. This Krack-built blower unit is suspended overhead in the center of the cooler, and by means of a series of well-arranged baffles breaks up the blast from the fans and provides uniform circulation throughout the cooler.

Freezer Compartment Coils

Many market installations may have a freezer compartment, that is, a small box where below-freezing temperatures are constantly maintained.

For this type of duty bare pipe steel or copper coils are used in most installations, while specially constructed fin coils with wide fin spacing serve the purpose in other installations. The plate-type coil is also especially adapted to this type of work.

It is obvious that with below-freezing temperatures, defrosting must be done manually.

Where the plate-type or bare pipe steel coil is used, the frost may be scraped off without interrupting the service

This method of frost removal is not recommended on copper coils as the instrument used for scraping may damage the tubing.

In the case of copper coils, the lines should be equipped with hand shut-off valves so the users can close those coils off when necessary for defrosting.

A freezer compartment should be operated with a separate compressor, both from a practical standpoint and also for economy.

With a separate compressor the compartment may be maintained at any desired temperature without affecting the balance of the system in the other fixtures. It may also be shut off when not needed or could easily be adjusted to maintain regular storage temperatures if so desired.

If the compartment coils are connected to a condensing unit along with other fixtures maintaining regular temperatures, the suction pressure on the compressor is adjusted to the coldest coil, which is the freezer coil, and all of the other coils must be controlled by some two-temperature arrangement. The net result is that the low suction temperature and pressure reduces the capacity of the condensing unit.

Always install a check valve in the suction line of the colder freezer coils where they are duplexed with higher temperature units.

An automatic regulating or suction pressure valve or a snap-action valve may be used to maintain the higher temperature in the other units.

COMBINATION CONTROL

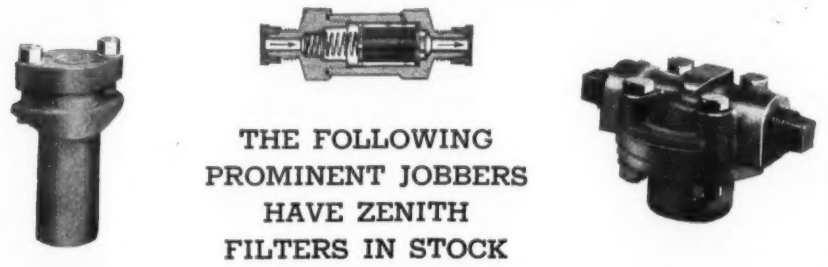
A combination thermostat and solenoid will also serve the purpose. The compressor could be controlled by a low pressure control adjusted to cut out on the freezer compartment temperature. Another suitable means of control on a combination storage box and freezer job is to control the storage box temperature with a thermostat.

Use an automatic regulating or suction-pressure valve in the suction line of the storage box to maintain the pressure and temperature difference in the suction gas, and a check valve in the suction line of the freezer coils to prevent the hot gas from entering these coils.

In this case, the running time necessary for the storage box should be sufficient to keep the storage box be-

(*Concluded on Page 17, Column 1*)

ZENITH REFRIGERANT FILTERS



THE FOLLOWING PROMINENT JOBBERS HAVE ZENITH FILTERS IN STOCK

Refrigerant Filter Jobbers

Atlanta, Georgia	Leo S. Bosarge Company
Atlantic City, New Jersey	Refrigeration Equipment Company
Baltimore, Maryland	Melchoir, Armstrong, Dessau Company
Binghamton, New York	Service Supply Company
Boston, Massachusetts	Rhode Island Supply & Eng. Company
Brooklyn, New York	Coleman Electrical Supply Company
Brooklyn, New York	Melchoir, Armstrong, Dessau Company
Buffalo, New York	Root, Neal & Company
Cambridge, Massachusetts	Melchoir, Armstrong, Dessau Co.
Charlotte, North Carolina	Henry V. Dick & Company
Chicago, Illinois	The Harry Alter Company
Chicago, Illinois	Automatic Heating & Cooling Supply Co.
Chicago, Illinois	H. W. Blythe Company
Chicago, Illinois	Borg Warner Service Parts Company
Chicago, Illinois	H. Channon Company
Chicago, Illinois	W. W. Grainger Company, Incorporated
Cincinnati, Ohio	The Merkel Brothers Company
Cincinnati, Ohio	Williams & Company, Incorporated
Cleveland, Ohio	The Harry Alter Company
Cleveland, Ohio	Debes & Company
Cleveland, Ohio	Williams & Company, Inc.
Columbus, Ohio	Hughes-Peters Electrical Corporation
Dallas, Texas	Beckett Electric Co.
Detroit, Michigan	Borg Warner Service Parts Company
Detroit, Michigan	J. M. Oberc, Incorporated
Fernwood, Mississippi	Enochs Sales Company
Greensboro, North Carolina	Home Appliance Service Co., Inc.
Harrisburg, Pennsylvania	Melchoir, Armstrong, Dessau Co.
Harrisburg, Pennsylvania	Refrigeration Supply Company
Harrison, New Jersey	Refrigeration Equipment Company
Hartford, Connecticut	Melchoir, Armstrong, Dessau Company
Houston, Texas	Walter Refrigeration Supply Company
Indianapolis, Indiana	Duncan Supply Company
Indianapolis, Indiana	F. H. Langsenkamp Company
Kansas City, Missouri	Forslund Pump & Machinery Company
Long Island, Hempstead, New York	Sid Harvey, Incorporated
Long Island, Jamaica, New York	Sid Harvey, Incorporated
Los Angeles, California	Refrigeration Service Incorporated
Los Angeles, California	Refrigeration Supplies Distributor
Louisville, Kentucky	S. W. H. Supply Company
Minneapolis, Minnesota	Refrigeration & Industrial Supply Co.
Mt. Kisco, New York	County Seat Plumbing Supply Company
Newark, New Jersey	T. W. Binder Company
Newark, New Jersey	Melchoir, Armstrong, Dessau Company
New Orleans, Louisiana	Enochs Sales Company
New York, New York	Aetna Supply Company
New York, New York	The Harry Alter Company
New York, New York	Federal Refrigerator Corp.
New York, New York	Melchoir, Armstrong, Dessau Company
New York, New York	Paramount Electrical Supply Co., Inc.
New York, New York	Servicemen Supply Company
Omaha, Nebraska	H. C. Noll Company
Paterson, New Jersey	White & Shauger, Incorporated
Philadelphia, Pennsylvania	Melchoir, Armstrong, Dessau Co.
Pittsburgh, Pennsylvania	Oakland Refrigeration Supply
Pittsburgh, Pennsylvania	William M. Orr Company
Pittsburgh, Pennsylvania	Williams & Company, Inc.
Providence, Rhode Island	Rhode Island Supply & Eng. Co.
Richmond, Virginia	Refrigeration Supply Company
Richmond, Virginia	A. R. Tiller, Incorporated
Rochester, New York	Melchoir, Armstrong, Dessau Company
Rochester, New York	Ontario Metal Supply Company
Sacramento, California	Refrigeration Supplies Distributor
St. Louis, Missouri	The Harry Alter Company
San Antonio, Texas	Westbrook Carburetor Electrical Co.
Shreveport, Louisiana	Interstate Electric Company
Sioux City, Iowa	Refrigeration Supply Company
Springfield, Massachusetts	C. P. Payson Company
Washington, D. C.	Melchoir, Armstrong, Dessau Company
White Plains, New York	County Seat Plumbing Supply Co.
Wilkes-Barre, Pennsylvania	Radio Service Company
Montreal, Canada	Modern Household Appliances, Ltd.
Montreal, Canada	Railway & Eng. Specialties Ltd.
Toronto, Canada	Railway & Eng. Specialties Ltd.
Winnipeg, Canada	Railway & Eng. Specialties Ltd.

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New York, New York	Melchoir Armstrong, Dessau Co.

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Two and one-half times finer than 120 mesh screen.

Easily installed

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For Sulphur Dioxide, Freon or Methyl Chloride Refrigerators

Positive Protection against dirt in Expansion Valves, Solenoid Valves, Float Valves, Capillary Tubes and other liquid control devices.

ZENITH CARBURETOR COMPANY

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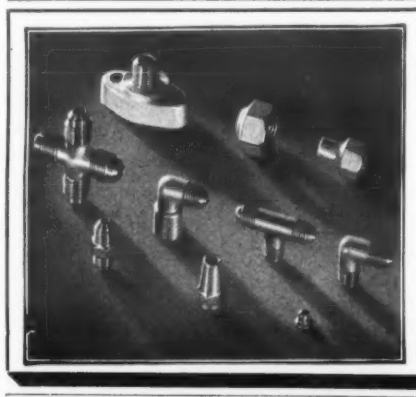
BENDIX AVIATION CORP.

DETROIT, MICHIGAN



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Refrigeration Parts are *Certified to Excel*

Ask for catalog covering complete line of Compressor Parts, Valves, Condensing Water Regulators, and Fittings

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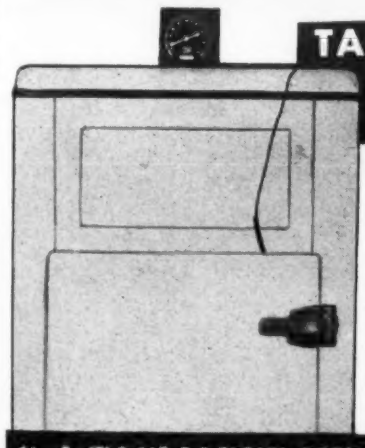

TAG DIAL THERMOMETERS GIVE COMPARTMENT TEMPERATURE AT A GLANCE . . . . .

Convince that "hard to sell" customer the "easy TAG Dial Way"—Just place the bulb in the food compartment or on the evaporator coils—set the dial on top of the box as illustrated—close door—then watch the pointer—it will move almost as fast as the second hand of your watch. Within a minute the true temperature will be indicated accurately for all to see. You need this instrument in your service and sales work. Get the information today. Write for Catalog No. 1136-25.

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Krack Suspended Blower Unit

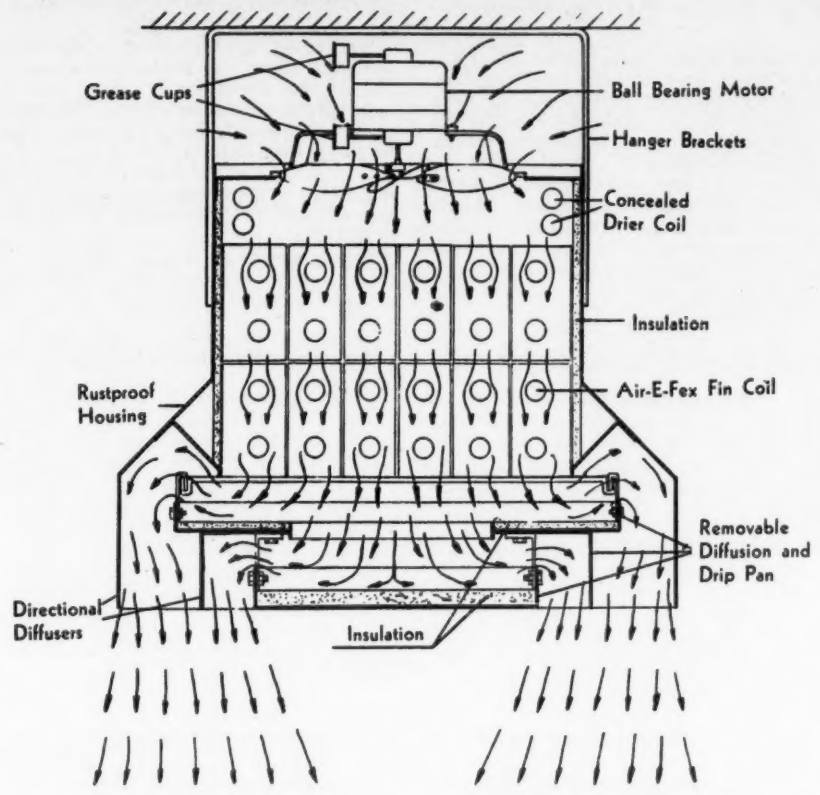

Fig. 157—Krack-built blower unit to be installed overhead in center of cooler. Baffles provide uniform circulation throughout cooler.

Controlling Freezing Coils for Maximum Cooling Efficiency

(*Concluded from Page 16, Column 5*)

low freezing. If it is not, the suction pressure on the storage box coils must be increased by adjusting the two-temperature valve. This will result in longer compressor operation and lower storage compartment temperatures. It will not affect the temperature in the storage box as it is being controlled by the thermostat.

Here again the importance and necessity of adjusting the expansion valves on all the units to the lowest possible super heat, or what is the same thing, to use every available square foot of coil surface to keep the suction temperature and pressure as high as possible and thereby increase the efficiency of the entire system, is stressed.

It is equally important that the system have a sufficient charge of refrigerant so that when all units are frosting right up and into the drier coils or heat interchangers, *there is a positive liquid seal between the expansion valves and liquid receiver.*

This can be determined very readily and accurately with a liquid flow indicator installed in the liquid lines. Bubbles will indicate a shortage. The absence of bubbles assures a positive liquid seal.

Oklahoma Utility Makes Farm Appliance Demonstration

OKARCHE, Okla.—The first of a series of demonstrations of home and farm electrical equipment was given at the Steve Shulte farm north of here under the supervision of Roy E. Hayman of the Oklahoma Gas & Electric Co.'s commercial department.

Food prepared by Mrs. Greta Offutt with several electric cookers and an electric range was served the visitors.

During the preparation of the meal a washer, ironer, and vacuum cleaner were demonstrated.

The use of farm aids was covered, and the whole was sponsored by John T. Naylon of the utility's El Reno division. Those of the commercial department who aided Mr. Hayman were Fred Copeland, Don Anderson, and Tom Fielder.

150 Attend Kelvinator Commercial Meeting

BALTIMORE—About 150 Kelvinator factory officials and members of Kelvinator commercial distributing organizations from Virginia, Maryland, and central Pennsylvania attended the recent Kelvinator regional meeting held at the Lord Baltimore hotel under the direction of L. T. M. Ralston, New York division manager. The meeting was the first of its kind to be held here.

Factory representatives who attended the meeting included: J. K. Knighton, sales manager of commercial air conditioning; A. H. Renick, sales manager of standard commercial electric cooling; Otis Harm, southern representative; J. F. Worden of the advertising and sales promotion department; E. F. Layport, factory representative; D. A. Dimitry, manager of the Baltimore-Washington factory branch; and A. O. Price, assistant manager.

Republic Electric to Handle Texaco Oils

DAVENPORT, Iowa — Republic Electric Co., refrigeration parts jobber, has been appointed distributor in this territory for Texaco Capella refrigeration oils, according to E. L. Bengston, assistant sales manager.

Ansul Chemical Co. has also announced that the company has been named distributor of its refrigerants.

REFRIGERATION SUPPLY JOBBER ACTIVITIES

Macklanburg Opens Jobbing Dept.

OKLAHOMA CITY — Macklanburg Brass & Copper Products, Inc., for the past several years distributor of Revere copper and brass products in this territory, has opened a refrigeration jobbing department under the direction of A. R. Morin, announces K. B. Covert, manager of the company.

Mr. Morin has been associated with Kelvinator commercial refrigeration and air-conditioning distributors in this territory for the past 10 years, and is well acquainted with Oklahoma dealers and service men.

At present, the company has initial stocks from about a dozen manufacturers of refrigeration parts and supplies, and is planning addition of several other lines in the near future. It is a member of National Refrigeration Supply Jobbers' Association.

Tentative arrangements have been made for a formal opening on April 8, to be sponsored by Charles S. Anderson, representative of Imperial Brass Mfg. Co., Chicago.

Macklanburg's policy of intensive direct-mail advertising to keep customers informed of its available services will be followed in the new refrigeration supplies department, it was announced.

London Jobber Named Canadian Outlet for Betz Filterpure

LONDON, Ont., Canada—Refrigeration Supplies Co., Ltd., has been appointed exclusive Canadian jobber for the new Filterpure cooling unit for display cases and reach-ins manufactured by Betz Corp., Hammond, Ind.

One of the largest jobbing houses in Canada, Refrigeration Supplies Co., Ltd., also is exclusive agent for Ranco controls, Peerless coils, Temprite products, and other refrigeration equipment. The company has three field men to contact manufacturers, distributors, and dealers.

Tansley Named Works Manager At Cleveland Apex Factory

CLEVELAND—L. R. Tansley, formerly with Benjamin Electric Mfg. Co., Desplains, Ill., has been appointed works manager of Apex Electrical Mfg. Co. here.

Reynolds-Brown Opens As Little Rock Jobber

LITTLE ROCK, Ark.—New wholesale firm handling air-conditioning and electric refrigeration parts and supplies here is the Reynolds-Brown Electric Co.

Officers of the company are C. N. Brown, president, W. M. Brown, vice president, and A. C. Medcalf, secretary-treasurer. The firm will handle Perfection repair parts and supplies; Imperial valves, fittings, and tools; Fedders condensers, cooling units and expansion valves.

Its stock will include refrigerator motors, motor brushings and bearings, refrigerants, and dehydrated copper tubing.

Borg-Warner Publishes New Parts Catalog

CHICAGO—The Borg Warner Service Parts Co. was to have ready for distribution April 1 a 180-page consolidated catalog listing parts and accessories for electric refrigeration and automatic heating and air-conditioning units.

Copies will be distributed to 20,000 service organizations, according to Ray P. Johnson, manager of the refrigeration and automatic heating parts department. The consolidated catalog, Mr. Johnson states, was devised for the convenience of service organizations whose activities cover both fields.

Marshall Explains Control Operation at Lingo Meeting

HOUSTON—R. C. Marshall, factory engineer of the Penn Electric Switch Co., Des Moines, explained the proper action, installation, and adjustment of refrigeration controls to 60 service men from this area at a meeting sponsored by D. C. Lingo Co., refrigeration and air-conditioning supply jobber.

In addition to Houston operators, service men from Eagle Lake, La Grange, Bryan, and Beaumont were present at the meeting, one in a series of educational lectures for service men being sponsored by the jobber concern.

Next address in the series will be made April 9 by one of the design engineers of the Starr Co., Richmond, Ind., who will explain compressor design from the factory standpoint. All refrigeration service men in the territory have been invited to attend.

Lingo recently moved from its old address in the M and M Building to new quarters at 1414 Fannin St.

McKenna Takes Promotion Post With Elliot & Evans

CLEVELAND — M. P. McKenna, well known in the appliance merchandising field here, has resigned his position as sales promotion manager of the Zenith Machine Co., manufacturer of Zenith washing machines, to join Elliot & Evans, Inc., Electrolux distributor in northern Ohio.

In his new position, Mr. McKenna will have charge of sales promotion in Ashtabula, Lorain, Lake, and Geauga counties, which were recently added to the distributor's territory.

Mr. McKenna was at one time connected with Apex Electrical Mfg. Co., and also was an independent dealer.

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COMMERCIAL EVAPORATORS
DOMESTIC EVAPORATORS
COMFORT COOLERS
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REFRIGERATION AND AIR CONDITIONING PRODUCTS

CATALOGUES ON REQUEST

McCORD RADIATOR & MFG. CO.
DETROIT, MICHIGAN

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Artic
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(DU PONT METHYL CHLORIDE)

1 Small volume displacement per unit of refrigeration permitting the use of small, compact equipment.
2 Not corrosive to ordinary equipment.
3 Operates at positive pressures, even at sub-zero temperatures.
4 Fast cooling and quick freezing.
5 Gives controlled low temperatures easily and efficiently.
6 Thermally stable and does not decompose at any temperature existing in the refrigeration system.
7 Has low head pressure, adaptable to air-cooled condensers and light-weight equipment.
8 Economical of power.
9 Handled, serviced with ease.
10 Easy to "hold"—comparatively low leakage.
11 Easy to engineer—no unusual design problems.

ARTIC—*the Preferred Refrigerant for Service Work*

DU PONT

E. I. Du Pont de Nemours & Co., Inc.
The R. & H. Chemical Dept., Wilmington, Del.

THE MASTERCRAFT
ADJUSTABLE PAD AND CARRYING HARNESS
FOR SAFE DELIVERY OF AUTOMATIC REFRIGERATORS

Pad and harness ADJUSTABLE to many sizes and styles of cabinets. Economical—Efficient. Sturdily constructed, easily applied. Name of refrigerator attractively lettered on pad without charge.

Pad (Adjustable) $9.50 ea.

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The Pad and Harness are separate.

Individual carrying straps $1.75 each and up. Write for 1937 Folder & Prices on entire Pad Line.

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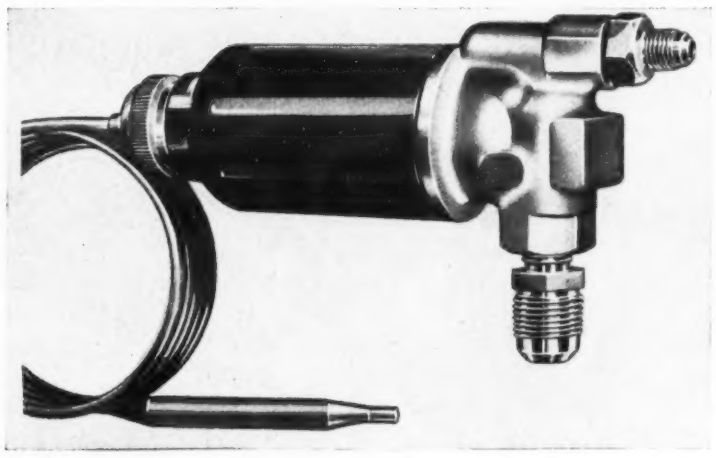
STANDARD REFRIGERATING APPLIANCES

Another . . .
OUTSTANDING VALUE
COMBINING MANY NEW and ADVANCED FEATURES



TYPE "B"
THERMOSTATIC VALVES

These rugged, dependable valves assure a brand of performance which sets a new high mark for products of this nature. They are constructed of the finest materials available to the industry. A forged body, tough, non-porous and finely machined is only a part of the many new features embodied in these valves. Others include easily removable needles and seats, removable power elements (which have always been gas-charged) easily changed in the field. Adjustable and accurate to a fine degree. .093 orifice standard but .078, .125 and .156 available on order. ½" S.A.E. outlet standard with ⅜" or ⅝" available on request. ¼" S.A.E. inlet.

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— BUYER'S GUIDE —

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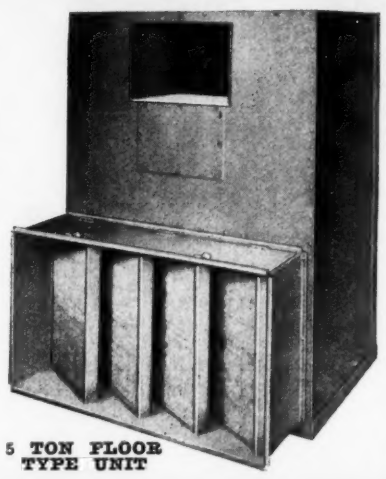
FLOOR TYPE AIR CONDITIONING UNITS

These Peerless Air Conditioning Units are setting new standards of performance for the industry—making new converts to the Peerless system of Air Conditioning.

WHY ? Because Peerless "Rifled" Fin Coils are the most efficient coils made. Because the Peerless Helicon Fan delivers a larger volume of air minus pulsation and vibration. Because the Peerless Filter Assembly is the simplest, yet most efficient. Because years of engineering research and skill are built into every unit.

Investigate the unlimited possibilities that Peerless offers—you'll be convinced.



5 TON FLOOR TYPE UNIT

PEERLESS of AMERICA, Inc.
ESTABLISHED IN 1912 AS THE PEERLESS ICE MACHINE CO.

New York Factory, 43-20 34th Street, Long Island City
Main Factory—General Offices, 515 West 35th Street, Chicago
Pacific Coast Factory, 3000 S. Main Street, Los Angeles

BUY PEERLESS FOR PERFORMANCE

New Ralls Hospital Equipped With Carrier Air Conditioning

RALLS, Tex.—The Plains Hospital and Clinic, opened here in February, has been equipped with a year-around air-conditioning system by McPherson Engineering Corp., Carrier distributor for this territory.

Said to be one of the most modern in this section, the hospital, which serves a large area of Texas, is equipped with complete X-ray, operating room, and laboratory facilities. Both surgeons' and patients' quarters are conditioned.

Gar Wood Display Awarded Exposition Plaque

DETROIT—The air-conditioning division of Gar Wood Industries, Inc., was awarded a bronze plaque for its display at the recent National Oil Burner and Air Conditioning Exposition in Philadelphia, reports General Manager Frank H. Dewey of the company.

The award was based on the attractiveness of the company's exhibit and on the manner in which product features were presented to the public.

Donnelly's New Plant to Be Windowless, Air Conditioned

KANSAS CITY, Mo. — The new $600,000 plant of Donnelly Garment Co., to be constructed here, will be completely air-conditioned and equipped with panels of structural glass in place of windows.

Designed by Alonzo Gentry, the building will be erected under the supervision of Voskcamp & Neville, architects.

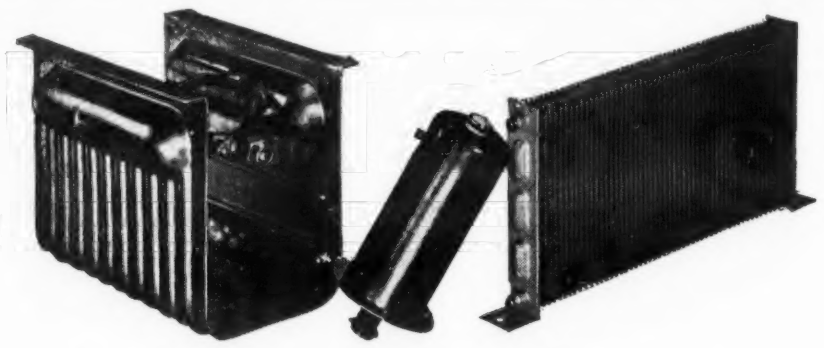
Mrs. James A. Reed, wife of the former Missouri senator, is president of the Donnelly company.

Natkin Installing Conditioning In Large Tulsa Building

TULSA, Okla.—Announcement has been made of plans to modernize and air condition the National Supply Co.'s building here. When Natkin & Co. complete this work, probably about June 1, it is believed that National Supply's building will be the largest individually-occupied air-conditioned building in the state.

Among the local buildings being air conditioned are the Philcade, Kennedy, and Philtower buildings.

SUPPLYING THE REFRIGERATION INDUSTRY



Evaporators, Receivers, Condensers, Compressor Domes, Compressors and Mechanical Parts. Also "Houdize," a perfected process for permanently uniting ferrous or non-ferrous metals.

OAKES PRODUCTS CORP. North Chicago and Decatur, Ill.
HOUDE ENGINEERING CORP. Buffalo, New York

DIVISIONS OF HOUDAILLE-HERSHEY CORPORATION
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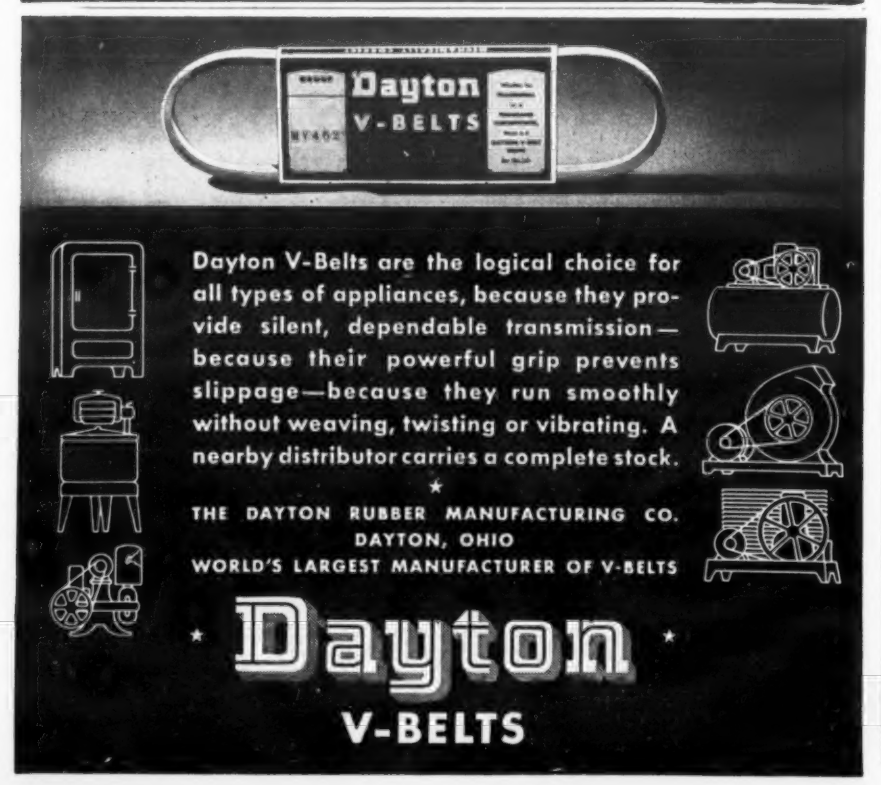
Dayton
V-BELTS
Dayton V-Belts are the logical choice for all types of appliances, because they provide silent, dependable transmission—because their powerful grip prevents slippage—because they run smoothly without weaving, twisting or vibrating. A nearby distributor carries a complete stock.
THE DAYTON RUBBER MANUFACTURING CO.
DAYTON, OHIO
WORLD'S LARGEST MANUFACTURER OF V-BELTS
Dayton
V-BELTS

— AIR CONDITIONING MADE EASY —

General Types of Control Systems for Air-Conditioning Installations

SECTION NO. 14

CONTROLS & ZONING

BY F. O. JORDAN

The Air By-Pass Method

The air by-pass method is a common way of accomplishing the above result. With this system, a by-pass damper is provided which opens as the sensible load is decreased, allowing a portion of the air to by-pass around the air-conditioning coil. In the case of the direct expansion coil this method is quite effective, since the reduction in load upon the system resulting from the reduction in air flow through the coils, causes the compressor suction pressure to fall (see Section No. 4). This results in a lower refrigerant pressure and temperature in the coil.

This reduction in coil temperature and the reduction in air velocity through the coil result in an increase in sensible and latent work done per pound for air (see Section No. 3), the increase in latent work per pound of air being much greater than the increase in sensible work per pound because the per cent of increase in the differential between dew-point temperature and coil temperature is greater than the per cent of increase in the differential between dry-bulb and coil temperature, as explained in Section No. 3.

In the case of the direct expansion coil, the increase in latent work per pound is great enough to offset the decrease in air passed through the coil so that the net latent capacity of the equipment remains the same or is slightly increased. But the increase in sensible work per pound being much less than the increase in latent work per pound, the sensible increase per pound is insufficient to offset the decrease in air handled so that the net result is a reduced sensible capacity. Therefore, a reduction in sensible capacity is accomplished without appreciably affecting latent capacity.

In the case of the water-chilled air-conditioning coil, this control is not nearly so effective, because the reduction in average water temperature in the coil due to reduction in air load is much less than the refrigerant temperature reduction in air load. The result in the case of the water-chilled coil is a decrease in sensible capacity and a lesser decrease in latent capacity so that operation is better with the by-pass open during reduced sensible load than with no by-pass.

However, it is obvious that control is not so effective as in the case of the direct expansion coil, because a reduction in the latent capacity of the chilled-water coil accompanies the opening of the by-pass damper.

The operation of the by-pass damper may be under the control of either a room thermostat or a room humidistat, the result being about the same in either case. In the case of thermostatic control the by-pass damper opens upon rising humidities. With either type of control, damper operation may be graduated, so that the damper opens gradually as the temperature falls or the humidity rises, or the control may be positive, so that the damper opens to the full amount when the temperature falls or the humidity rises to a predetermined point.

Generally, the design is such that when the damper is opened wide, about one half the total air flow is by-passed around the coil, as the net latent capacity begins to fall off soon after this point is reached, even with the direct expansion coil. At this per cent of by-passed air, the sensible capacity is decreased by 30 to 35%, depending upon the initial condition.

At higher initial refrigerant temperatures (by "initial" refrigerant temperature is meant the refrigerant temperature when the damper is shut), the decrease in sensible capacity is greater for a given by-pass damper opening, than at lower initial refrigerant temperatures.

Therefore, since higher refrigerant temperatures are required for projects of lower latent-to-total ratios, the by-pass damper humidity control is more effective for projects of light latent ratio (hence light occupancy concentration). This is fortunate because, as stated above, the possible reduction in sensible load coincidental with maximum latent load is greater with light occupancy projects, so that a more effective control is needed for projects of low latent (hence high sensible) ratio.

In addition to the thermostat or the humidistat which controls the by-pass damper, a thermostat must be provided which stops the equipment before the room bulb temperature falls to some predetermined level which would be uncomfortable.

When the by-pass damper is under the control of a themostat, the slight fall in room temperature resulting from a small decrease in sensible load opens the by-pass damper and so reduces the sensible capacity without reduction in latent capacity. This change in performance characteristics results in longer running time so that a rise in room humidity is retarded. If the opening of the by-pass damper reduces the sensible capacity until it is less than the existing sensible load, the temperature rises again and closes the by-pass damper, restoring the maximum sensible capacity.

When the by-pass damper is under the control of a humidistat, the slight rise in room humidity resulting from a decrease in running time due to a small reduction in sensible load opens the by-pass damper with the results described above. If the opening of the by-pass damper lowers the sensible capacity below the sensible load, the room dry-bulb temperature rises.

This rise in room temperature lowers the *relative* humidity (see any psychrometric chart), while the latent work performed by the equipment is reducing the moisture content and the relative humidity of the room. The combined effect of these actions is that the room relative humidity is lowered rapidly, so that the humidistat soon closes, restoring maximum sensible capacity.

The Refrigerant By-Pass Method (Direct Expansion Only)

This method is used also for controlling humidity. With this system a solenoid valve is used by means of which the refrigerant flow may be by-passed around a portion (generally one half) of the coil, so that the by-passed portion is placed out of service. The operation of this valve is controlled by either a thermostat or a humidistat as described above for the air by-pass method.

When a portion of the coil is placed out of service, the resultant decrease in load upon the condensing unit lowers the suction pressure, and the refrigerant temperature within the coil, with the effects upon performance and the same general results described above for the air by-pass.

The Back-Heat Method

This method is used occasionally for controlling humidity. When this method is used, an air-conditioning coil is employed for cooling and dehumidifying, while a "back-heating" coil is used for reheating the air after it passes from the air-conditioning coil when the cooling work, which the air-conditioning coil must perform in order to do the required latent work, is greater than the cooling load.

Just sufficient back-heating should be done to prevent the room temperature from being cooled below an undesirable level.

The back-heating coil may be heated by steam or hot water, or by the hot discharge gas from the compressor so that the back-heating coil serves as a condenser.

With the back-heat system, the air-conditioning coil should be selected, if possible, so that its sensible and latent capacities equal sensible and latent loads respectively, as with this selection, the back-heater is used only when the room temperature falls due to a reduction in sensible load below the sensible capacity of the air-conditioning coil.

However, for projects in which the latent-to-total load ratio under maximum sensible load conditions is higher than can be met by a practicable air-conditioning coil, an air-conditioning coil must be selected with a latent capacity equal to the maximum latent load, but with a sensible capacity greater than the maximum sensible load. Upon the projects, the back-heater must work at all times.

With the back-heat system the air-conditioning coil is operated under the control of a thermostat and humidistat, so that the equipment is operated if either the room temperature or the room humidity rises above a predetermined level. A thermostat is employed to place the back-heater in operation when the room temperature

(Concluded on Page 19, Column 1)

Characteristics of Inherent Method Of Air-Conditioning Control

(*Concluded from Page 18, Column 5*)

falls below a lower predetermined level.

The Inherent Method

As stated near the beginning of this section, all air-conditioning equipment possesses a considerable degree of inherent control. In the inherent method, full advantage is taken of these inherent controlling properties, and an additional inherent controlling characteristic is designed into the air-conditioning coil by giving it a sufficient surplus in latent capacity. This enables the system to cope with the maximum latent load even when the running time has been reduced by a reduced sensible load.

The surplus in latent capacity is obtained by lowering the refrigerant temperature a given amount below that required to balance the latent-to-total load ratio at maximum conditions. For the lowest possible running time, a greater latent surplus is required, because the latent work must be done during a shorter time.

For this reason greater reductions in refrigerant temperatures are required for projects of greater possible reductions in sensible load coincidental with heavy latent load. The exact refrigerant temperature reduction, or latent-to-total increase, required for any given project may be computed. Fig. 71 and Table 15, Section 21, show the necessary latent-to-total increase by showing the decrease in sensible and the increase in latent which may be applied to the computed sensible and latent loads respectively to form a basis of equipment selection which will result in satisfactory inherent control of humidity.

Not only is the latent load increased in the inherent method of selection, but the sensible load is decreased. The reason for the decrease in sensible load is that the sensible capacity per unit of coil area is increased, so that the size of the coil should be reduced, not only in the interests of economy, but because an *increase* in net sensible capacity of the equipment would tend to defeat the purpose of inherent humidity control, since it would result in a reduction of running time and of latent work done.

After the sensible reduction and the latent increase have been applied, and the resultant new total load and latent-to-total load ratio have been determined, the coil is selected so that its total capacity and its latent-to-total capacity ratio equal the new total load and latent-to-total load ratio, with air entering the coil at the temperature and humidity conditions existing *when the room dewpoint is 60°*.

When the sensible load is at or near maximum, with the running time at or near 100%, the room dewpoint temperature will be reduced below 60° because of the surplus in latent capacity which is the basis of inherent control. The room dewpoint temperature will rise to 60° only when a reduced sensible load has lowered running time.

The dewpoint temperature will rise still further when running time is yet further reduced. Since an increased dewpoint of entering air raises the load upon the coil (see Section 3), the load upon the equipment *during running time is increased* as the sensible load upon the conditioned space is reduced, and since an increased load upon the equipment results in a higher refrigerant temperature in the system (see Sections 4 and 6), the operating refrigerant temperature is increased.

The discussion of inherent control up to this point has been based upon operation of the equipment under thermostatic control only. Under this type of control, a constant room dry-bulb temperature would be maintained, while the room humidity would vary between a low level during the shorter running time at maximum sensible loads, and a high level during the shorter running time at minimum sensible load coincidental with maximum latent load, both extreme conditions being within the comfort zone.

A better method of control is to operate the equipment under the control of an instrument having both thermostatic and humidistatic elements, so arranged that higher room humidities set the thermostatic element to "make" the circuit at lower room dry-bulb temperatures, while lower humidities set the thermostatic element for higher temperatures.

Such an instrument may be so arranged that at the low room humidity level resulting from the surplus latent capacity at full running time, a relatively high room dry-bulb temperature will be permitted. Since full running time can result only from maximum sensible load and high outside temperatures, this means that moderately high room dry-bulb temperatures will exist when high outside dry-bulb temperatures occur.

As mentioned above, this condition is desirable because of the elimination of "shock" upon entering or leaving the conditioned area, and because the sensible load is decreased at maximum outside temperatures due to the reduction in temperature differential between outside and inside conditions.

Conversely, at the higher room humidity level resulting from the shorter running time due to reduced sensible loads, the humidistatic element will lower the setting of the thermostatic element, so that a lower room dry-bulb temperature will be obtained, with the result that running time will be reduced by a lesser percentage and the rise in room humidity restrained. Such a lower room dry-bulb temperature level is very desirable during periods of light sensible load when outside temperature is not high.

Such an instrument may be so adjusted that the room condition of temperature and humidity would follow a given constant effective temperature line.

In fact, lower effective temperatures at moderate outside temperatures and higher effective temperatures at higher outside temperatures are to be preferred. Furthermore, inherent control is made more effective by allowing a greater variation in room humidity than would exist if operation were held upon one effective temperature line within practicable limits. For these reasons, a preferable operating line for the equipment is represented by the line "E-F," Fig. 70.

By allowing a rise in humidity level under the conditions described above, the following results are obtained:

1. The latent load is reduced because the rate of evaporation of perspiration from the occupants is lowered, and because the differential between the outside and inside humidity levels is reduced.

2. The moisture-absorbing capacity of the building construction is raised.

3. The latent capacity of the coil is raised because the temperature differential between room dewpoint and coil surface is increased.

By taking advantage of assistance offered by allowing some rise in humidity at reduced sensible loads, it is unnecessary to employ so great a decrease in coil temperature as would otherwise be required, yet this is not done at the expense of comfort.

Inherent Humidity Control Chart

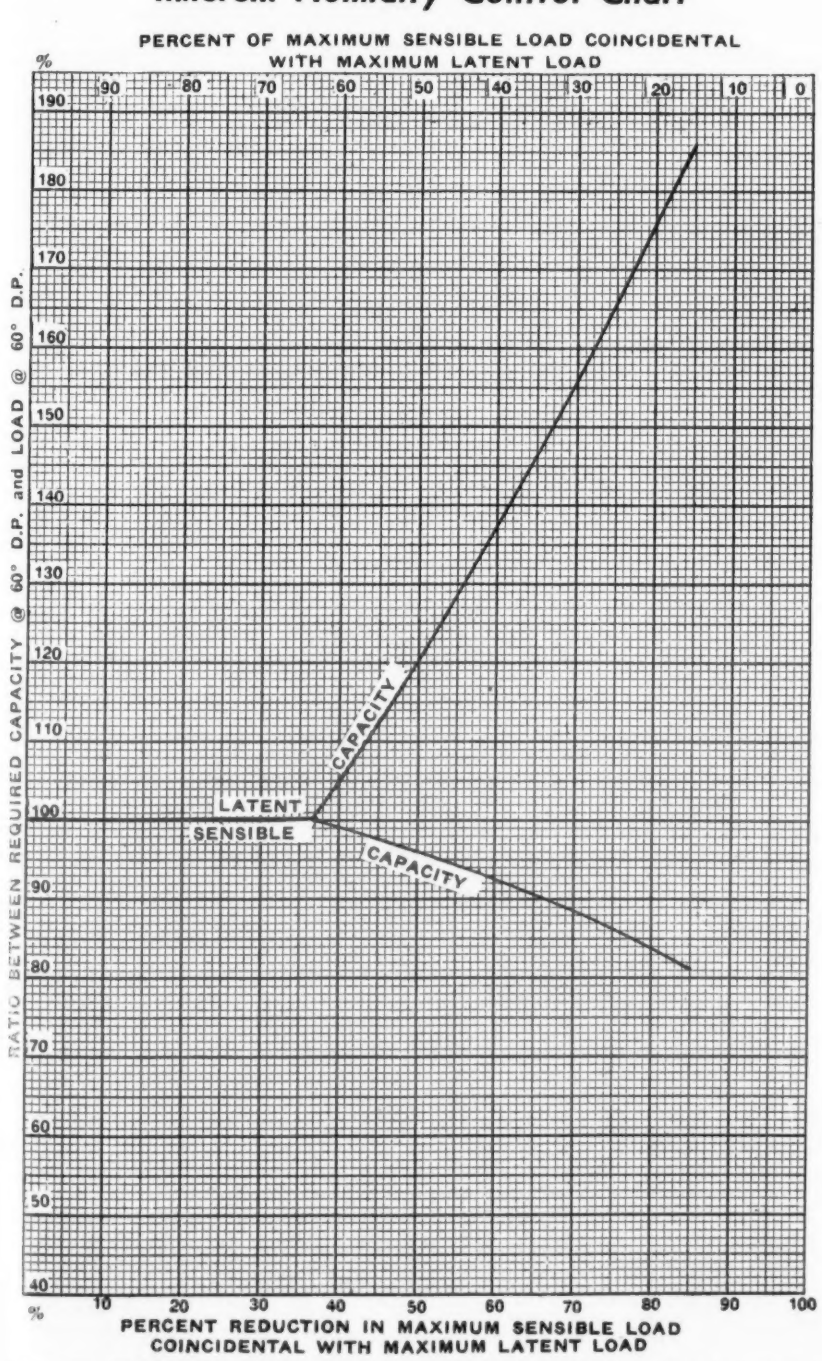
PERCENT OF MAXIMUM SENSIBLE LOAD COINCIDENTAL WITH MAXIMUM LATENT LOAD
%
90 80 70 60 50 40 30 20 10 0
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40
RATIO BETWEEN REQUIRED CAPACITY @ 60° D.P. and LOAD @ 60° D.P.
CAPACITY
LATENT
SENSIBLE
CAPACITY
% 10 20 30 40 50 60 70 80 90 100
PERCENT REDUCTION IN MAXIMUM SENSIBLE LOAD COINCIDENTAL WITH MAXIMUM LATENT LOAD

Fig. 71—These curves show the percent of increase of latent capacity at 60° D.P. over latent load at 60° D.P. and the percent of decrease of sensible capacity at 60° under sensible load at 60° D.P. which are required to enable direct-expansion air-conditioning equipment to prevent the room D.P. temperature from rising above 63° D.P. (80° D.B.—55% R.H.) due to decrease in running time, at various percents of decrease in maximum sensible load coincidental with maximum latent load, taking into account the increase in latent capacity, the decrease in latent load and the increase in moisture-absorbing capacity of building construction at the higher D.P. temperature.

Example—If the maximum sensible load can be decreased 50% coincidental with maximum latent load, the latent capacity of the coil at 60° D.P. must be 121% of the maximum latent load at 60° D.P. while the sensible capacity at 60° D.P. must be 95% of maximum sensible load at 60° D.P.

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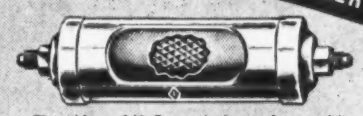

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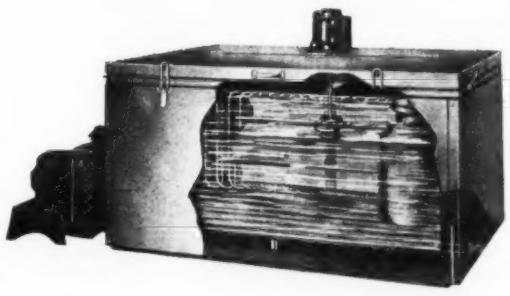

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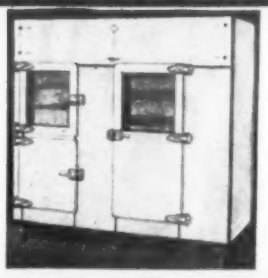

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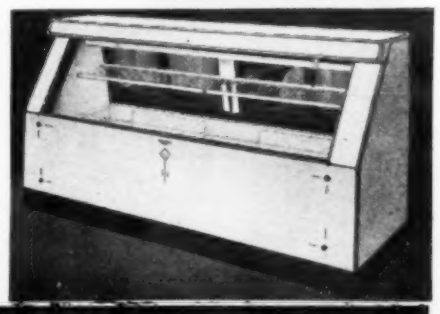

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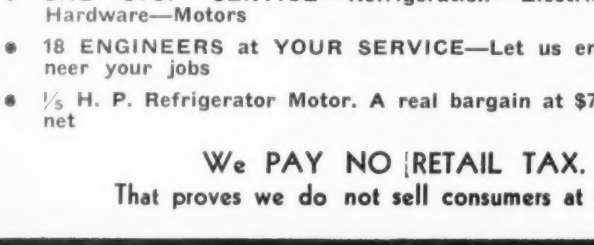

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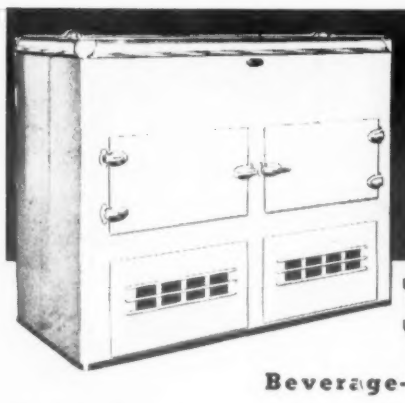

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Los Angeles Jobber Making Refrigerant Tubing Clamp

LOS ANGELES — Refrigeration Service, Inc., distributor of refrigeration supplies and accessories, is manufacturing "Pinchoff Protectors," clamps used to keep refrigerant tubing rigid after it has been opened, according to L. P. Roth, manager.

The company purchased the manufacturing rights to the clamps from United Mfg. Co., Los Angeles, former maker of the equipment, Mr. Roth said.

Little Rock G-E Branch Open

LITTLE ROCK, Ark.—General Electric Supply Corp. has opened a new sales and service branch here. The branch will be part of the company's St. Louis district, which is managed by A. H. Shirley.

Pascale & Kramer Start Firm

WESTPORT, Conn.—M. M. Pascale and Paul Kramer have opened a new firm, Westport Appliance Service, at 31 Riverside Ave.

INFORMATION FOR SERVICE MEN

Newcum Gives Data on Capillary Tube Systems for Household Service Manual

Editor's Note: The following information, covering the capillary tube system is part of the additional text for the new edition of the MASTER HOUSEHOLD REFRIGERATION SERVICE MANUAL by K. M. Newcum which will be published as Volume 6 of the Refrigeration Library in April.

The information is being published in REFRIGERATION NEWS for the benefit of subscribers who already own a copy of the MASTER HOUSEHOLD REFRIGERATION SERVICE MANUAL (Vol. 3). Section 67B and the drawing on this page are to be added to Chapter 5, Evaporators; Sections 95, 96, and 97 and the other drawing are to be added to Chapter 9, Service.

67B. Capillary Tubes

A capillary tube is a very small inside diameter tubing usually around 1/64 of an inch in diameter. It serves the purpose in several household refrigerator systems of the float or expansion valve.

Principle of the capillary tube is extremely simple. Its small diameter tends to restrict, retard, or in effect, regulate the flow of liquid refrigerant into the evaporator to the correct amount required to keep the evaporator properly supplied with refrigerant.

It is usually located immediately ahead of the evaporator, its outlet being connected to the inlet of the evaporator, and its inlet connected to the liquid line from the liquid receiver.

The length of the tube governs the amount of liquid it will pass and the length varies from a few inches to several feet. With the same inside diameter, the shorter the tube, the more liquid it will pass and vice versa, and the increased length increases the resistance to the flow.

During the on-cycle with the resultant increase in head pressure and corresponding decrease in suction pressure, the flow through the tube is continuous and just sufficient to frost the entire evaporator.

At the close of the off-cycle, unlike any other refrigerant control device, the flow does not completely stop, but is retarded with a resulting decrease in head pressure and increase in back pressure.

This flow is continuous throughout the off-cycle and the high and low sides tend to equalize.

Due to this equalizing effect on the off-cycle, the liquid receiver charge is limited much like the high side float valve system to just enough to frost the evaporator during the on-cycle. An over-charge may result in a frosted suction line during the early part of the running cycle.

Some capillary tube systems are not equipped with a liquid receiver and as a result the bottom tube or tubes of the condenser act as a storage for the small quantity of liquid needed.

If a liquid receiver is used, the liquid outlet should be at the extreme bottom of the tank, as any surplus of liquid in the receiver will increase the amount of vapor admitted to the evaporator during the off-cycle and this is not desirable.

As shown in Fig. 75B, the Crosley refrigerator employs the capillary tube and no liquid receiver. The cycle of operation may be clearly followed in this illustration.

Note particularly the filter between the bottom tube of the condenser and the liquid line. Considering the continuous small inside diameter of the capillary tubing, it is obvious that all foreign material must be trapped or filtered out before entering the tube, or stoppage will result. A highly efficient filter must always be used just ahead of the tube.

In event of stoppage in the tube, the evaporator will be starved of liquid and will only frost part of the way over or, in other words, the reaction will be the same as if there were a shortage of refrigerant.

To distinguish between the two, with the gauges installed, stop the compressor. If the back pressure increases rapidly and the head pressure decreases in proportion, there is no evidence of a stoppage and the difficulty may be a shortage of refrigerant.

If, with the compressor idle, the back pressure increases unusually slow, there must be a stoppage in the tube or filter.

To remove the stoppage from the tube, it may be removed and high pressure admitted at what is normally the outlet end. This should blow the particle back and out of the tube. Straightening the tubing aids in removing the stoppage with pressure, or it may be carefully straightened out and a small steel wire forced through the inside, followed by air or refrigerant pressure for cleaning.

The capillary tube may be used with most any type of evaporator and while it could be used with a low pressure control, it is more desirable to control the motor with a thermostat.

95. Type '4A' Capillary Tube System

The type "4A" system is one comprising a conventional condensing unit either with or without a liquid receiver, but including the three conventional condensing-unit service valves. The evaporator may be of any type and the liquid throttling device is the capillary tube. Temperature control is by a thermostat. The evaporator is not equipped with shut-off valves.

The cycle of operation and general function of the capillary tube system are described in Chapter 5, beginning with Paragraph 67B.

As in all other types of systems, service instructions are given with the combination gauge set properly connected to valves 1 and 2.

96. Complaints on Type '4A' Capillary Tube System

Complaint No. 1:
Compressor Does Not Run Much; Evaporator Is Defrosting

The fact that the evaporator is defrosting would indicate that insufficient evaporation is taking place. That the compressor does not run much would indicate that the thermostat is not keeping the compressor in operation long enough to provide sufficient evaporation to reduce the evaporator temperature properly.

The thermostat should be checked for all possible causes of too warm a setting, or a discharge power element.

The overload relay should be examined. Conditions causing the overload relay to snap off should be corrected. If the serviceman is unable to obtain correct thermostat adjustment, he should replace the thermostat.

Complaint No. 2:
Compressor Runs Continuously, But Ice Does Not Freeze

In this complaint, as in complaint No. 1, insufficient evaporation of the refrigerant is taking place.

Inasmuch as the compressor runs continuously, the trouble probably is not in the thermostat, as it is keeping the compressor in operation in an attempt to reduce the evaporator temperature.

This complaint would indicate that the system is short of refrigerant, or that for some reason or other liquid refrigerant is not reaching the evaporator.

Operating pressure should be carefully checked and noted.

If the lowside pressure is slightly low and the high side pressure is normal or low, it would suggest that the system is short of refrigerant. Additional refrigerant should be added in small quantities through the lowside, making careful note of any pressure changes, and changes in the frost condition of the evaporator.

If adding refrigerant results in complete frosting of the evaporator and normal operating pressures and conditions, the system should be operated for a few cycles to determine the frost line. If the frost line extends outside the refrigerator, refrigerant should be removed until frost line is just inside the refrigerator.

If the operating head pressure is excessive and the lowside pressure higher than normal, the system may have air in the top of the condenser, insufficient air circulation over the condenser, a dirty condenser, or a combination of two or more of these conditions.

The condenser should be cleaned. There should be a generous flow of cool air across the condenser. The condenser should be purged of all air and non-condensible gases until the head pressure returns to normal.

A leaky discharge or suction valve would decrease the efficiency of the compressor and result in long running time and poor refrigeration.

Any stoppage or restriction in the capillary tube and/or filter would also retard the proper flow of liquid to the evaporator and result in this condition. A stoppage in the filter or capillary tube will result in the operating back pressure being considerably lower than normal.

If the capillary tube is only partially clogged, the tubing leaving the capillary tube and entering the evaporator will be extremely cold. This stoppage

(*Concluded on Page 21, Column 1*)

Cycle of Operation in Capillary Tube System

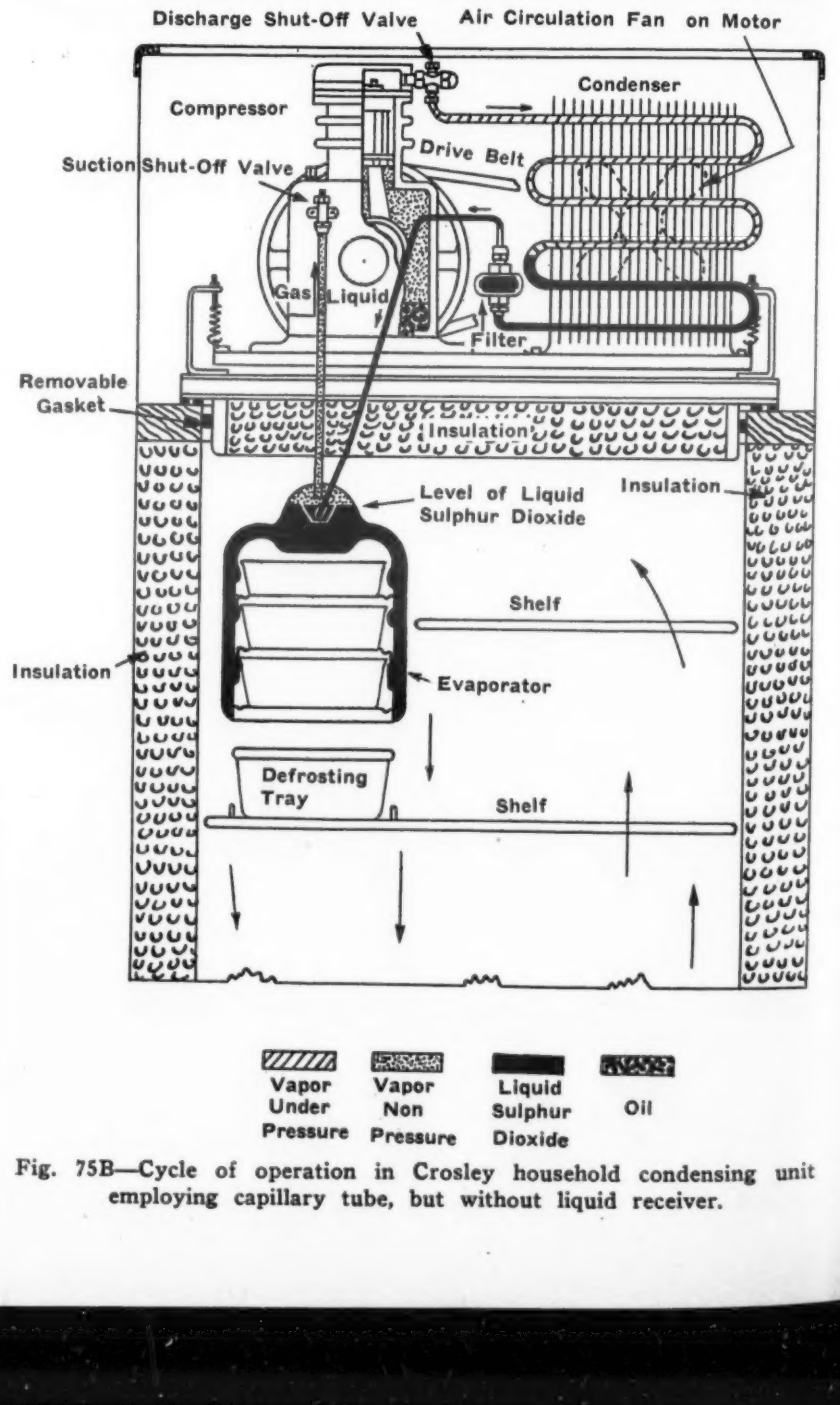


Fig. 75B—Cycle of operation in Crosley household condensing unit employing capillary tube, but without liquid receiver.

Service Operations on Type '4A' Capillary Tube Systems

(*Concluded from Page 20, Column 5*)

could be due to dirt or foreign matter or moisture freezing in the tube. Moisture may be removed with a dryer in the liquid line. Dirt or foreign matter must be removed or the capillary tube replaced

Complaint No. 3:
Trays or Metal Parts Tarnish

This would be the same for any system and is covered in complaint No. 3 under type "1A" system.

Complaint No. 4:
Costs Too Much to Operate

Same as complaint No. 4, type "3A" system.

Complaint No. 5:
Compressor Noisy

This would be the same for any type of system and is covered in complaint No. 5 under type "1A" system.

Complaint No. 6:
Ice Freezes But Food Spoils

Same as complaint No. 6, type "3A" system.

Complaint No. 7:
Food Has Peculiar Taste

Same as complaint No. 7, type "3A" system.

Complaint No. 8:
Motor Starts and Stops Too Much

Same as complaint No. 8, type "3A" system.

Complaint No. 9:
Blowing Fuses or Overload Relay Continues to Cut Out

Same as complaint No. 9, type "3A" system.

Complaint No. 10:
Compressor Knocks

See complaint No. 5, "compressor noisy".

Complaint No. 11:
Compressor Runs Continuously; Noise Inside Cabinet

This complaint should not exist with type "4A" system and it should be disregarded.

Complaint No. 12:
Refrigerant Leaks When Compressor Is Idle

Same as complaint No. 12, type "3A" system.

Complaint No. 13:
Food Freezing in Refrigerator

Same as complaint No. 13, type "3A" system.

Complaint No. 14:
Set Refrigerator Colder

Same as complaint No. 14, type "3A" system.

Complaint No. 15:
Machine Will Not Run

Same as complaint No. 15, type "3A" system.

Complaint No. 16:
Refrigerator Not Cold Enough

Check and proceed as in complaint No. 14.

Complaint No. 17:
Will Not Freeze Ice

Same as complaint No. 17, type "3A" system.

Complaint No. 18: Line Frosting; Water Dripping on Floor

This complaint would indicate that refrigeration is taking place outside the refrigerator.

Check to see which line is frosting. If it is the liquid line, there must be a partial stoppage between valve 3 and the refrigerator. If so, remove cause of stoppage.

If the suction line is frosting, it is due to two possible conditions. First condition is an over-charge of refrigerant, which during the off-cycle has overloaded the evaporator, allowing liquid to slop over into the suction line.

Second condition is an incorrect capillary tube. Either the inside diameter is too large for the evaporator involved, or there is not enough capillary tubing to throttle the liquid to the correct amount needed, hence more refrigerant is supplied the evaporator than it can vaporize, and the excess liquid runs over into the suction line causing refrigeration to take place therein.

There is also a remote possibility that the thermostat is keeping the refrigerant far too cold, thus drawing extremely cold vapor out of the evaporator which it would not ordinarily do if the refrigerator temperature were correct.

Complaint No. 19:
Motor Causing Radio Interference

This complaint is fully covered in complaint No. 19, type "1A" system and also in the chapter on motors.

Complaint No. 20:
Motor Running Hot

This complaint would be the same on any type of system and is completely covered in complaint No. 20 under type "1A" system.

97. Service Operations On Type '4A' System

Service operations are given with the combination gauge set installed and properly connected to valves 1 and 2 as illustrated in Fig. 114B.

All service operations on type "4A" system would be the same as on type "3B" system with the following exceptions.

Exception 1. Substitute the words "Capillary Tube" for "Expansion Valve."

Exception 2. Omit service operation No. 10, "Flushing the expansion valve," as the capillary tube does not respond to flushing.

Exception 3. Disregard note under service operation No. 1.

Type '4A' Capillary Tube System

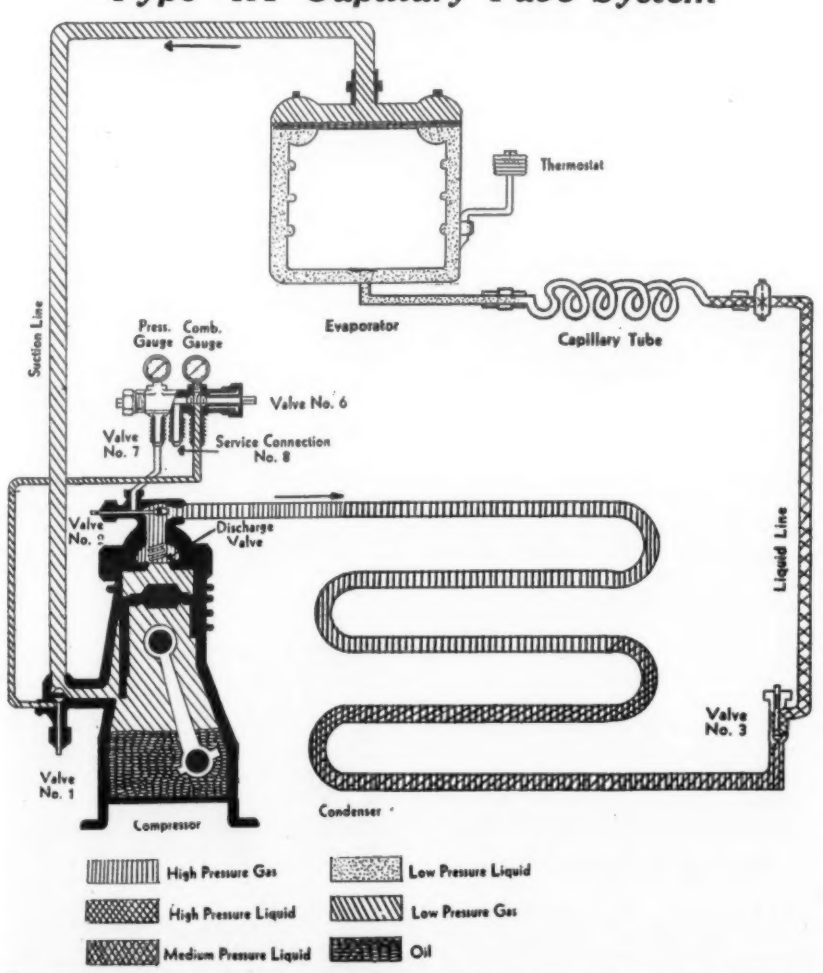


Fig. 114B—Type "4A" system, using capillary tube control. Evaporator is not equipped with shut-off valves.

Importance of Controls Told by Schellenberg On Canadian Tour

ST. LOUIS—Importance of control equipment in the successful operation of refrigerating and air-conditioning systems was stressed by A. B. Schellenberg, sales manager of Alco Valve Co., in a recent Canadian lecture tour, during which he addressed Canadian Refrigeration and Air Conditioning Society members in Montreal and Toronto, and service and installation groups in other cities.

"Control equipment should not be regarded merely as an accessory," Mr. Schellenberg said in his address. "It is an important integral part of the system, deserving of attention at the very inception of a refrigerating or air-conditioning installation. Automatic controls should receive careful consideration when the system is being designed, and not be left, like the last coat of paint, until the job is practically completed.

CONTROLS LIKE BRAIN

"The automatic control equipment on a refrigerating system may be likened to the brain," he added. "Its function is to coordinate and control the operation of the several component parts of the system in a manner conducive to efficiency, flexibility, and dependability.

"It must bring about a functioning of all of the separate members, to permit a maximum amount of work with the least expenditure of energy. The control equipment must make the system capable of performing under a wide variety of conditions with some degree of dependability, so that the performance of the refrigerating system as the same each cycle.

"A mechanical refrigeration system is often used primarily because of its operation when equipped with automatic controls, when, without them, it would not be a suitable or desirable investment.

"The control valves and switches do more than manual operation can possibly do in regulating flow, controlling temperatures, controlling capacities, regulating pressures, and coordinating this variety of functions to permit the safe and efficient operation of the system.

"Refrigeration today is a relatively young industry, and, like any normal healthy youngster, has experienced its initial growth in a more physical direction. In other words, most of the progress and development in refrigeration and air conditioning has been in the main elements of the system, such as the compressor, condenser, or evaporator.

"The control equipment itself has been developing and improving, along with the other equipment, and today better control valves are available, as well as better compressors and evaporators. The individual development of each of the integral parts of the system has reached a point where each must be considered in light of its effect upon the others.

CONTROL MUST DEVELOP

"The use of the brain or control equipment must develop to increase the effectiveness of the coordination of all these parts of a refrigeration system. Maximum evaporator efficiency depends upon the close correlation of the control valve and the evaporator, with due regard for the characteristics of each.

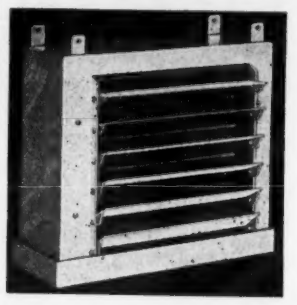
"Control valves available should be borne in mind when the evaporators themselves are being designed," Mr. Schellenberg told the Canadian refrigeration men. "Some evaporators, in their very construction, will not permit good refrigerant flow control, no matter what type control device available may be used.

"Size and arrangement of the tubes, as well as their position with respect to the point of greatest load, ratio of tubing length to diameter, quality of distribution obtained, and the existence or non-existence of a line of substantially complete evaporation —all have a great effect upon the character of the control which may be obtained."

Ranco Introduces Ten New Household Controls

COLUMBUS, Ohio—Ten new additions to the Ranco line of "Exact Replacement" domestic refrigerator thermostats are described in a bulletin just issued by Ranco, Inc., here, reports R. R. Dunlop, secretary. The bulletin, No. 701, also lists several new commercial controls recently added to the Ranco line.

BUYER'S GUIDE
SUPPLIERS WHO SPECIALIZE IN SERVICE TO THE REFRIGERATION AND AIR CONDITIONING INDUSTRIES



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FIN COILS
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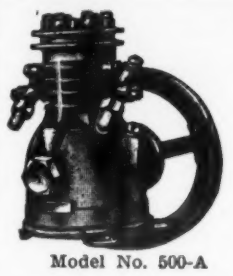

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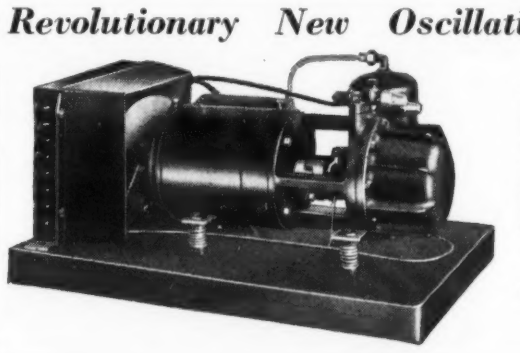

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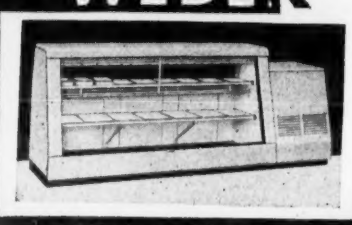
BUYER'S GUIDE

SUPPLIERS WHO SPECIALIZE IN SERVICE TO THE REFRIGERATION AND AIR CONDITIONING INDUSTRIES

SIX NEW CASES BY WEBER — New Steps to PROFIT



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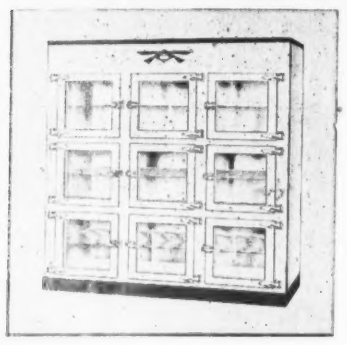

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Available in two lengths and any desired door arrangement, either glazed or solid, using three standard door sizes. Another of the profit-making items in the extensive Sherer line.

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● 1937 line offers wide variety and sensational values. 6 big new features and iron-clad guarantee. Only Tyler gives one-piece "welded steel" construction, 100% insulation. Wonderful sales opportunity. Most talked of and fastest selling line on market. WRITE today.

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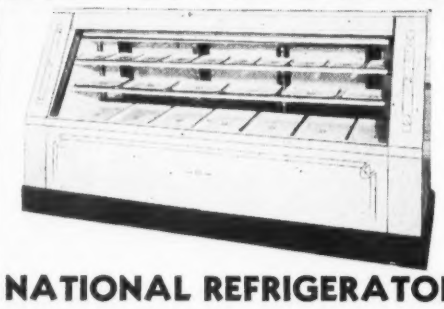

Built extra heavy, lasting many years longer than other makes. 3" to 4" cork insulation, 5" to 6" walls, porcelain inside and outside, triple plate glass front, triple glass rubber sliding doors, chromium hardware, all material highest grade, with or without coils or platters, two or three shelves, prices low, dealers wanted, few territories open. For more information write

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CAPACITY!---You Get It Here!

When you buy a refrigerator, you're interested largely in CAPACITY—and there's no cabinet today which offers so much storage space for so little cost as the Model No. 350.

THIRTY CUBIC FEET OF STORAGE—enough room for 14 cases of beverage—and yet, the No. 350 Refrigerator occupies but 9 sq. ft. of floor space.

The No. 350 Refrigerator comes with solid or glass display type doors in top section; your choice, too, of long wearing DuLux, or gleaming white Porcelain, chrome trimmed.

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From 2 gals. per hour to 500 gals. per minute

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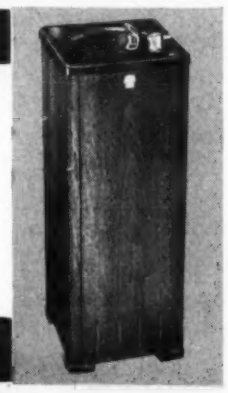
WATER coolers will be sold in increasing volume this spring and summer. Business men are buying new equipment, modernizing plants and offices. Cash in on this profitable business with Cordley Electric Water Coolers . . . made by an organization that has specialized in water coolers since 1889...small, compact, inexpensive, good looking units . . . a complete line . . . an easy way to get added sales and extra profits. Write for details.



CORDLEY & HAYES
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— AIR CONDITIONING ENGINEERING —

Evaporative Condensers, Cooling Towers And Ponds, or 'Double Use' of Water Are Answers to Condensing Problem

BY F. O. JORDAN

WITH a plentiful source of condenser cooling water, a problem even nowadays, how about the future when there may be so many comfort-cooling installations sucking away at the city mains that the overworked mains no longer can "stand the gaff?" Obviously something will have to be done long before such a condition exists, or it will constitute another "bottle neck" acting to limit the growth of air conditioning.

Taking the condenser cooling water supply from the city mains and then dumping it into the sewer after it has served its purpose is at present the most economical method, especially in the larger cities with adequate low-cost water systems. But this easy condition will change as the demand of the increasing number of air-conditioning installations for condenser water approaches the point of overloading the city water supply system.

TWO SOLUTIONS POSSIBLE

Two solutions suggest themselves: (1) to find ways of using for condenser cooling, water which is used for other purposes in any event; (2) to utilize methods of condenser cooling which require little or no water supply.

The former solution, of course, is limited to installations where some considerable and constant demand for water exists during the time when air conditioning is required which either delivers the water **after** it has been used for the process effect at a temperature and condition suitable for condenser cooling, or which can make use of water at a temperature ordinarily delivered **from** the condenser.

It appears that many "bets" are being overlooked along such lines, for many processes use water for cleaning and cooling effects which now is wasted to the sewer, but which is of such a character after use that it yet is suitable for condenser cooling, even though its use necessitates minor changes in certain controls which might be affected by foreign material in the water.

DUAL USE OF WATER

Furthermore, there are many institutions requiring air conditioning in which the cooling water as delivered from the condenser is perfectly suitable for steam condenser cooling, diesel cooling, boiler or heater make-up, lawn spraying, pulp making, all kinds of cleaning in a multitude of process applications. Very frequently the warming of the water resulting from its cooling of the condenser actually improves its value for process usage.

Frequently a great deal can be accomplished right now in the way of cutting operating costs, and consequently toward selling air conditioning, by making such a dual usage of water even through there is no immediate danger of overloading the water supply mains or sewers.

Before making any rash promises, the air-conditioning salesman or field man must do some preliminary checking as to the relationship between the quantity, temperature, and character of any water required for process work, and the requirements of the condensing equipment which he proposes to furnish.

WATER REQUIREMENTS

For cooling, the conventional refrigerating condenser can use water at any temperature up to about 100°, with the average summer condition being around 75° to 80°. The water quantity requirements per ton of refrigerating effect depend upon the available condensing water temperature, and the "head" pressure desired.

With nominal Freon equipment practice, the water requirements vary from less than 1 g.p.m. per ton with 55° water, to about 2 g.p.m. per ton with 80° water, and perhaps 4 or 5 g.p.m. per ton with 95° or 100° water.

The delivery temperature of the condensing water from the refrigerating condenser depends upon the head pressure, hence the leaving water temperature generally is around 85° or 90° for 55° or 60° inlet water, 95° for 80° inlet, and perhaps 105° or 110° for 95° or 100° inlet water. The water must contain no ingredients which would clog the water control valve if used, or corrode or clog the condenser tubing.

By intelligent use of these relationships the field man can decide upon the suitability of process water for use in condenser cooling, or the suitability of the water for other usages after it has served for cooling the refrigerating condenser.

EVAPORATIVE EQUIPMENT

The other solution of the problem mentioned above demands the use of air-cooled equipment, of "evaporative cooling" in the form of "evaporative" condensers, cooling towers or cooling ponds.

Acute localized pains are experienced by some engineers at the merest thought of using the straight air-cooled condenser, because of reduced compressor efficiency and increase in power required per ton resulting from the higher head pressures generally necessitated by its use.

The trouble is alleviated somewhat in certain designs by adding the evaporative effect of spraying water over the face of the air-cooled condenser.

Other evaporative condensers are available which in effect are a cooling tower, with self-contained water-cooled condenser in which the condensing water is cooled by evaporative effect and circulated through the condenser.

These condensers are larger than the water-cooled condenser, and require air connections so that their use is objectionable or even impossible in some instances.

COOLING TOWERS AND PONDS

Cooling towers and cooling ponds are widely used for cooling the condenser water after it has been heated by the condenser. These cooling methods generally require from 3% to 5% "make-up" water. Data regarding the capacities and requirement of various makes and types of equipment may be obtained from the manufacturers.

With the cooling tower, the water "off" the tower generally is lowered to about 5° higher than the **wet-bulb** temperature of the outside air. With the cooling pond, about the same results are obtained if 300 sq. ft. of pool surface is provided per ton of refrigeration capacity.

If a lake or river is available as a source of condensing water supply, the water temperature generally is about equal to the **mean** season air temperature for lakes of average depth of 20 ft. or less, while for average depths greater than 25 or 30 ft., the water temperature generally is about 5° lower. If such sources are available there is of course no problem regarding city water mains.

USE OF WELL WATER

Where practicable, another way of "sidestepping" the problem is to drill a well. The temperature of well water depends upon its depth. For wells from 50 ft. to 250 ft. deep, the temperature generally will not be more than 5° higher than average **annual** mean temperature for the locality.

For shallow "surface" wells, the water temperature usually is about 5° above the average **monthly** temperature during the summer months.

The well is a problem all its own, and should be left to the local expert. Well water often contains materials or chemicals which make its use undesirable. The continuous draw which a well will stand can be determined only by test, but any good well should stand in excess of 100 g.p.m.

Hipsking to Install 17-Ton Unit in Ft. Wayne Store

FT. WAYNE, Ind.—Hipsking Heating & Plumbing Co. has been awarded the contract to install a 17-ton General Electric air-conditioning unit in Fishman's Women's Apparel store here.

Tulsa Office Building Job Largest in Southwest

TULSA, Okla.—Contracts have been let recently for a huge central plant, said to be the largest air-conditioning plant in the Southwest, which is to be used for air conditioning both the 22-story Philtower Building and the Philcade Building which are located here on opposite sides of the same street.

The refrigeration system is a 900-ton ammonia job, conditioning the buildings through the medium of refrigerant-chilled water.

Four Frick ammonia compressors will be used, in addition to condensers, water-coolers, and other necessary equipment.

Wisconsin U. to Hold Heating & Conditioning Conference

MADISON, Wis.—A conference on air conditioning and automatic heating, open without charge to all persons interested, will be held April 21 to 23 at the University of Wisconsin, under the auspices of the university's department of mechanical engineering and the university extension division.

Lectures, demonstrations, and exhibits of the conference will be held in the laboratories of the mechanical engineering building. Prof. G. L. Larson, past president of American Society of Heating and Ventilating Engineers, is in charge of the conference.

Birmingham ASHVE Group Holds Organization Meeting

BIRMINGHAM, Ala. — Tentative plans for a Birmingham unit of American Society of Heating & Ventilating Engineers were made at a meeting at which A. V. Hutchinson, national secretary, was a guest.

Arrangements for the meeting were made by Harold V. Fried, Birmingham Electric Co. engineer, and C. P. Lichty of Lichty Engineering Co.

Controls Are Feature of New G-E Conditioner

BLOOMFIELD, N. J.—Said to differ radically from any existing heating or air-conditioning equipment, a new oil-fired warm air conditioner has been developed by the General Electric Co. It was shown for the first time at the Oil Burner and Air Conditioning Exposition in Philadelphia.

The new equipment is designed to supply automatic oil heat and winter air conditioning in a single compact unit. It cleans all incoming air, removes dust, adds moisture and heat, and circulates this conditioned air throughout a home. Summer cooling may be added also at any time that it is desired by the purchaser.

Fundamental principle of operation of the new equipment is the method of burning oil developed by G-E five years ago, involving the forcing downward of atomized oil to meet an upward secondary air stream, thus producing a floating white-heat flame about five feet long that turns upward on itself.

A series of electric controls supervise and protect the equipment to an unusual degree, according to G-E engineers. The humidistat automatically controls the supply of moisture to living quarters during the heating season. Air filtering and circulation in summer are available through the installation of a summer switch. A thermal control, or snap-action thermostat, maintains the desired temperature.

Quiet operation is said to result from the use of the newly developed "aphonic" radial flow fan.

Viscous coated glass wool filters of large dust-holding capacity are furnished to remove dust and dirt from the air, while radiation screens are installed to maintain a cool outside jacket. An expansion relief door shuts down the entire equipment in case of surges or irregularities.

The motor is self-lubricated with fuel oil, the burner nozzle is air-cooled, and ignition is by an electric spark.

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REPLIES to advertisements with Box No. should be addressed to Air Conditioning and Refrigeration News, 5229 Cass Ave., Detroit, Mich.

POSITIONS WANTED

YOUNG MAN 26 years old. Several years' experience in refrigeration installation engineering and service maintenance. Knows latest controls, automatic heating stokers and oil burners. Graduate of Utilities Engineering Institute of Refrigeration of Chicago. Desires connections with manufacturer or dealer in refrigeration sales engineering, installation, or service. Box 910, Air Conditioning and Refrigeration News.

REFRIGERATION SERVICE ENGINEER. Several years' experience with all models Kelvinator, also 10 other makes, domestic, commercial, and air-conditioning. Can figure cooling and heating loads. Wide experience with automatic heating. Honest, dependable, ambitious, no boozer. Have tools and car. Will go anywhere. Located now in middle west. Box 911, Air Conditioning and Refrigeration News.

REFRIGERATION SERVICE ENGINEER —5 years' experience on installation and servicing of domestic and commercial units. Fifteen years' experience steam and hot water heating and installation of water works equipment. Completed course on drafting. U.E.I. graduate. Available May 1. Interested in permanent position which offers advancement. Excellent references. Box 912, Air Conditioning and Refrigeration News.

EQUIPMENT FOR SALE

MAJESTIC SURPLUSES. 1000 complete conventional and hermetic type units as is $15.00. New evaporators $4.00. New Majestic capacitor motors $4.50. New refrigerator shelves $5.00 hundred. New copper gas condensers $2.00. Electrolytic condensers 75¢. 2 hour test cabinets with air lifts and Bristol records $7.50. 3/16" tinned copper tubing 30¢ lb. Discounts on quantities. G & G COMPANY, 5801 Dickens, Chicago.

AIR COOLED condensers 9"x10½" double row. New $1.19. Three blade fan pulleys 7⅜", 2½" A groove, ½" bore $0.39. 8"x3" oval end receivers with valve, mounting bolt in bottom, inlet ftg. in top $1.19. Without valve $0.79. Tag controls, old style, but new, less plates $1.95 each. Penn type L, low side controls, specify settings desired, $3.25 each. REFRIGERATION PRODUCTS, INC., 122 W. Illinois St., Chicago.

DETROIT Thermostatic Expansion Valves. Several hundred purchased from a large manufacturer. New, in original cartons. Type 673 $4.95. Type 674 $4.75. Exchange price: type 673 $3.95, type 674 $3.75. Specify refrigerant, tube length and inlet and outlet connections desired. Right reserved to limit quantity and subject to stock on hand. REFRIGERATION PRODUCTS, INC., 122 W. Illinois St., Chicago.

REPAIR SERVICE

MAJESTIC AND GRIGSBY-GRUNOW refrigerator and radio parts service. We have purchased all of the original Grigsby-Grunow Majestic refrigerator and radio parts service. We are the only original, the only genuine, the only direct factory parts and service anywhere in the world. Beware of inferior replacements and parts. Everything we sell is factory guaranteed. Send for prices and dealerships. G & G GENUINE MAJESTIC REFRIGERATOR & RADIO PARTS SERVICE, 5801 W. Dickens Ave., Chicago.

MAJESTIC — GENERAL ELECTRIC — SERVEL hermetic units repaired and exchanged. Majestic—$20.50—General Electric—$25.00—Servel—$18.50 F.O.B. our factory. One year unconditional guarantee. Every unit undergoes complete tests for temperature, cycling, wattage consumption and quietness on genuine test equipment. See our advertisement this issue under "Buyer's Guide". REFRIGERATION MAINTENANCE CORP., 365 E. Illinois St., Chicago, Ill.

EXPANSION VALVES, rebuilt or exchanged: Detroit, Fedders, American Injector, automatic $1.75; thermostatic $3.25. Mayson automatic $1.00. Household cold controls rebuilt or exchanged (modern types only) $2.25. REFRIGERATION PRODUCTS, INC., 122 W. Illinois St., Chicago, Ill.

EXPORTERS, Case and Service men—Frigidaire and Kelvinator compressor units ⅓ H.P. to 1½ H.P. air or water cooled thoroughly overhauled or not as you wish. Guaranteed against moisture. Have large assortment used fittings and 2-tray evaporators also panel valves. KENMORE ENGINEERING CO., INC., 82 Brookline Ave., Boston, Mass.

MAJESTIC and General Electric units, rebuilt or exchanged. Any model Majestic $18.50. G.E. household models $25.00. Standard Majestic pumps, rebuilt or exchanged $4.95. Prices f.o.b. our factory with a six month guarantee. REFRIGERATION PRODUCTS, INC., 122 W. Illinois St., Chicago.

GENERAL ELECTRIC and Majestic hermetically sealed units repaired and exchanged. Guaranteed work. Wholesale only. Give model when writing. All prices quoted f.o.b. Chicago. AMERICAN REFRIGERATING ENGINEERS, INC., 2257 Silverton Drive, Chicago, Illinois.

CONTROLS REPAIRED for the refrigeration and air-conditioning trade. Any make, almost any type. Every control individually calibrated. Steam traps, packless valve glands, and regulators repaired. If it contains a bellows, Halectric can repair it. Service prompt, prices right, guarantee reliable. HALECTRIC LABORATORY, 1793 Lakeview Road, Cleveland, Ohio.

ARTIFICIAL FOOD DISPLAYS

MANUFACTURERS of artificial fruits, vegetables, meats. Over fifty pieces from which to select, including full size Turkey, Capon, Chicken, and Watermelon. Sets to accommodate every make of refrigerator. Reasonable prices ranging from $2.75 to $9.00 per set. Write for complete data. ROMAN ART CO., INC., 2704 Locust Blvd., St. Louis, Mo.

— PATENTS —

Issued March 9, 1937

2,072,974. COOLING DEVICE. Walter W. Williams, Bloomington, Ill. Application Oct. 24, 1934, Serial No. 749,811. 2 Claims. (Cl. 261—88)

2,072,977. REFRIGERATING APPARATUS. Francis Russell Bichowsky, Washington, D. C., assignor, by mesne assignments, to General Motors Corp. Application Feb. 26, 1932, Serial No. 595,361. 1 Claim. (Cl. 62—115)

2,072,987. REFRIGERATION. Wilhelm Kogel and Nils Widell, Stockholm, Sweden, assignors, by mesne assignments, to Servel, Inc., Dover, Del. Application Jan. 25, 1934, Serial No. 708,172. In Germany Feb. 11, 1933. 5 Claims. (Cl. 62—119.5)

2,073,091. ABSORPTION REFRIGERATING SYSTEM. Harry K. Bergholm, Larchmont, N. Y., assignor, by mesne assignments, to Servel, Inc., Dover, Del. Application April 11, 1933, Serial No. 665,501. 10 Claims. (Cl. 62—119.5)

2,073,092. REFRIGERATION APPARATUS. Harry K. Bergholm, Stockholm, Sweden, assignor, by mesne assignments, to Servel, Inc., New York, N. Y. Original application April 11, 1933, Serial No. 665,501. Divided and this application Aug. 23, 1935, Serial No. 37,483. 7 Claims. (Cl. 257—36)

2,073,106. REFRIGERATING APPARATUS. Harry B. Hull, Dayton, Ohio, assignor to General Motors Corp., Dayton, Ohio. Application May 21, 1935, Serial No. 22,551. 16 Claims. (Cl. 62—1)

2,073,110. AIR CONDITIONING APPARATUS. Harvey B. Lawton, Bloomington, Ill., assignor to Williams Oil-O-Matic Heating Corp., Bloomington, Ill. Application May 22, 1935, Serial No. 22,830. 7 Claims. (Cl. 257—3)

2,073,123. REFRIGERATING APPARATUS. Rolf M. Smith, Dayton, Ohio, assignor to General Motors Corp., Dayton, Ohio. Application Jan. 31, 1935, Serial No. 4,212. 2 Claims. (Cl. 62—95)

2,073,175. REFRIGERATING CABINET. Clara E. Quinn, Mount Vernon, Ill., assignor to Driice Appliances, Inc., Mount Vernon, Ill. Application March 14, 1936, Serial No. 68,861. 8 Claims. (Cl. 62—91.5)

2,073,176. REFRIGERATING APPARATUS AND METHOD. Clara E. Quinn, Mount Vernon, Ill., assignor to Driice Appliances, Inc., Mount Vernon, Ill. Application March 14, 1936, Serial No. 68,862. 3 Claims. (Cl. 62—114)

2,073,309. ACCESSORY FOR MECHANICAL REFRIGERATORS. Carl A. Klenk and Bessie S. French, Chicago, Ill. Application July 11, 1936, Serial No. 90,094. 3 Claims. (Cl. 259—104)

2,073,450. VIBRATION DAMPING MOUNTING FOR COMPRESSORS, ETC. Sylvester A. Limpert, Bay Shore, N. Y., assignor to Mechana Kold Corp., Bay Shore, N. Y. Application Feb. 10, 1933, Serial No. 656,090. 4 Claims. (Cl. 248—22)

2,073,516. REFRIGERATING SYSTEM. Edward R. Fitzgerald, Rexford, N. Y., assignor to General Electric Co. Application June 15, 1933, Serial No. 675,930. 13 Claims. (Cl. 62—4)

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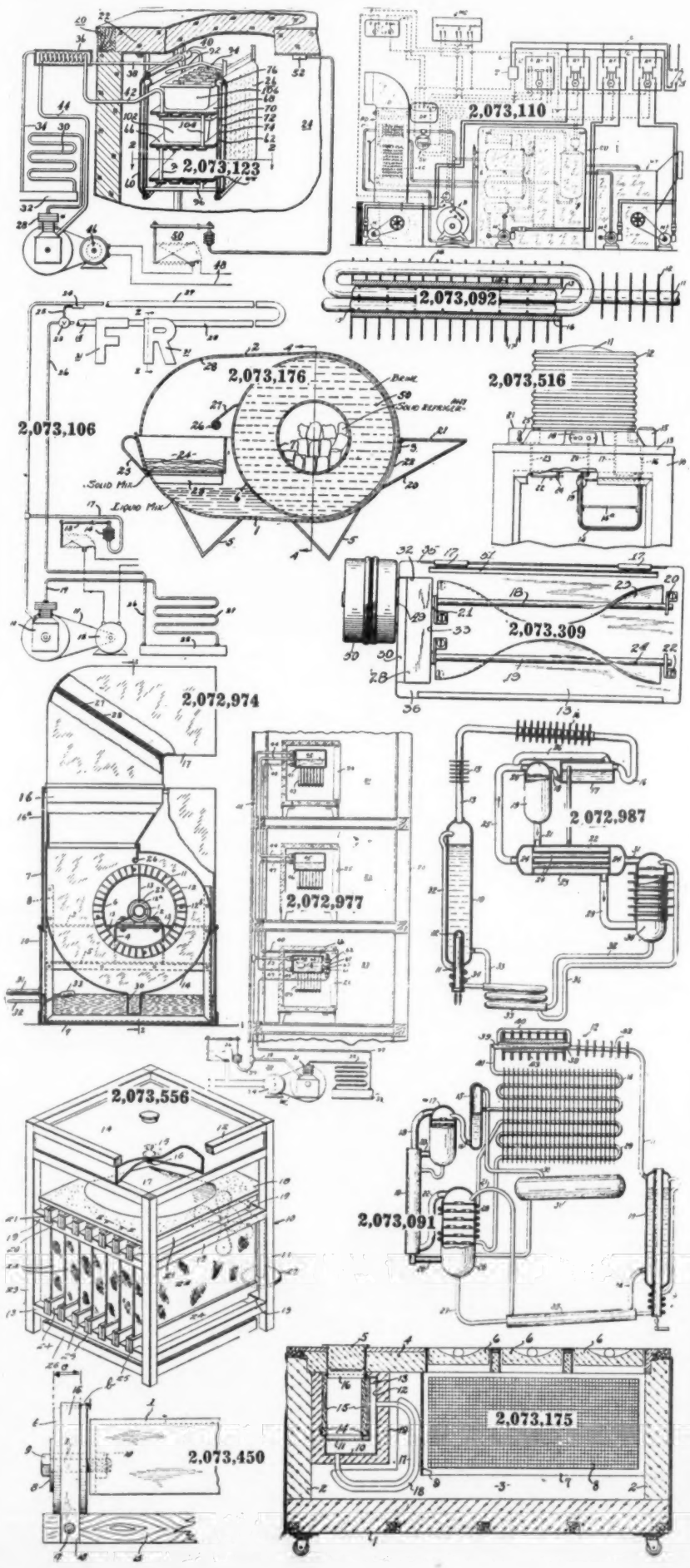

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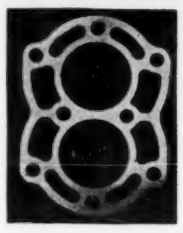

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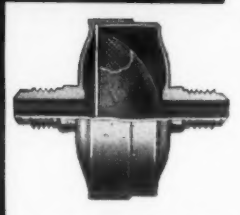

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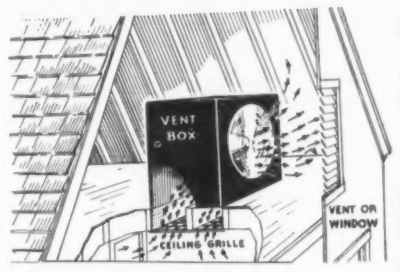

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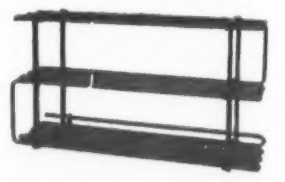

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